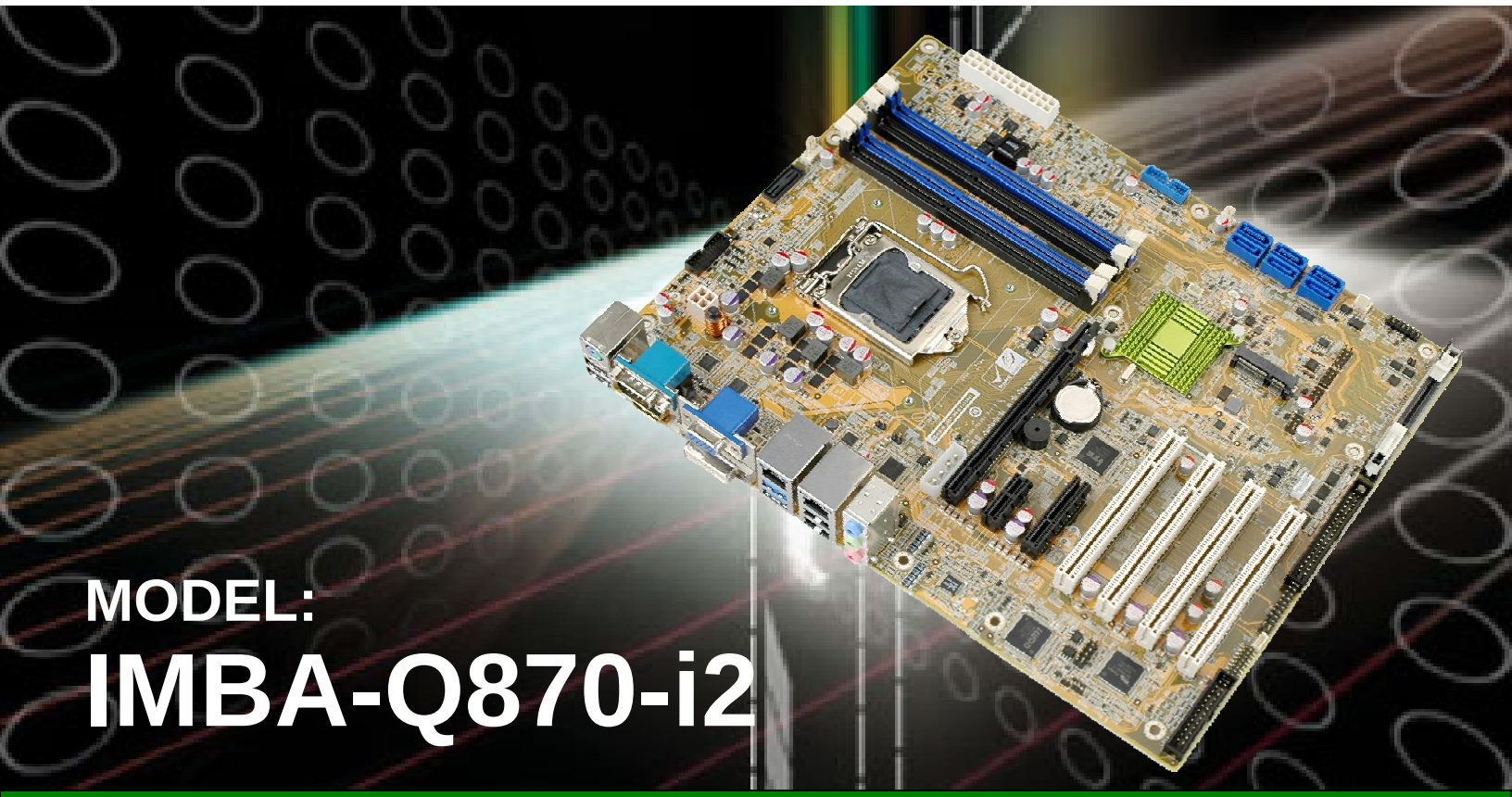
IEI Integration Corp.



MODEL:

IMBA-Q870-i2

ATX Motherboard with LGA1150 Intel® Core™ i7/i5/i3, Pentium® or Celeron® CPU, Intel® Q87 Chipset, Dual GbE, DDR3, DVI, HDMI, DisplayPort, VGA, USB 3.0, COM Ports Six SATA 6Gb/s Ports, IPMI 2.0 and RoHS

User Manual

Rev. 1.00 –8 January, 2014

RoHS Lead Free

Revision

Date	Version	Changes
8 January, 2014	1.00	Initial release

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Chapter

1

Introduction

1.1 Introduction

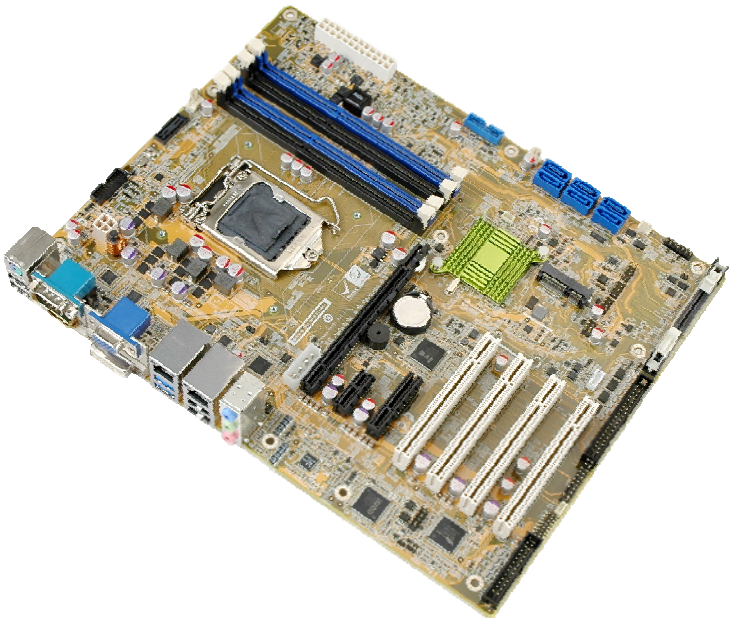


Figure 1-1: IMBA-Q870-i2

The IMBA-Q870-i2 is an ATX motherboard. It accepts a Socket LGA1150 Intel® Core™ i7, Core™ i5, Core™ i3, Pentium® or Celeron® processor and supports four 240-pin 1333/1066 MHz dual-channel DDR3 DIMM modules up to 32.0 GB maximum. The IMBA-Q870-i2 includes VGA, HDMI, and DVI-D display ports for triple independent display. Expansion and I/O include four PCI slots, one PCIe x16 slot, one PCIe x4 slot with x1 signal, one PCIe x1 slot, two USB 3.0 ports on the rear panel, two USB 3.0 ports by pin header, four USB 2.0 on the rear panel, four USB 2.0 by pin header, six SATA 6Gb/s connectors, six COM ports, and two keyboard/mouse connectors.

1.2 Benefits

Some of the IMBA-Q870-i2 motherboard benefits include:

- Powerful graphics with multiple monitors
- Staying connected with both wired LAN connections
- Speedy running of multiple programs and applications

1.3 Features

Some of the IMBA-Q870-i2 motherboard features are listed below:

- ATX form factor
- RoHS compliant
- LGA1150 Intel® Core™ i7, Core™ i5, Core™ i3, Pentium® or Celeron® processor supported
- Intel® Q87 Chipset
- Four 240-pin 1333/1066 MHz dual-channel DDR3 DIMMs with up to 32.0 GB memory
- HDMI, DisplayPort, DVI-D and VGA interfaces support triple independent display
- Supports IPMI 2.0 via IEI iRIS-2400 module
- Two Intel® PCIe GbE connectors, LAN1 with Intel® AMT 9.0 support
- Six SATA 6Gb/s connectors support RAID 0, 1, 5, 10
- One PCIe Mini slot for mSATA modules or USB devices
- Four PCI card expansion slots
- One PCIe x16 card expansion slot
- One PCIe x4 card expansion slot with x1 signal
- One PCIe x1 card expansion slot
- Multiple USB 3.0 and USB 2.0 ports
- High Definition Audio

1.4 Connectors

The connectors on the IMBA-Q870-i2 are shown in the figure below.

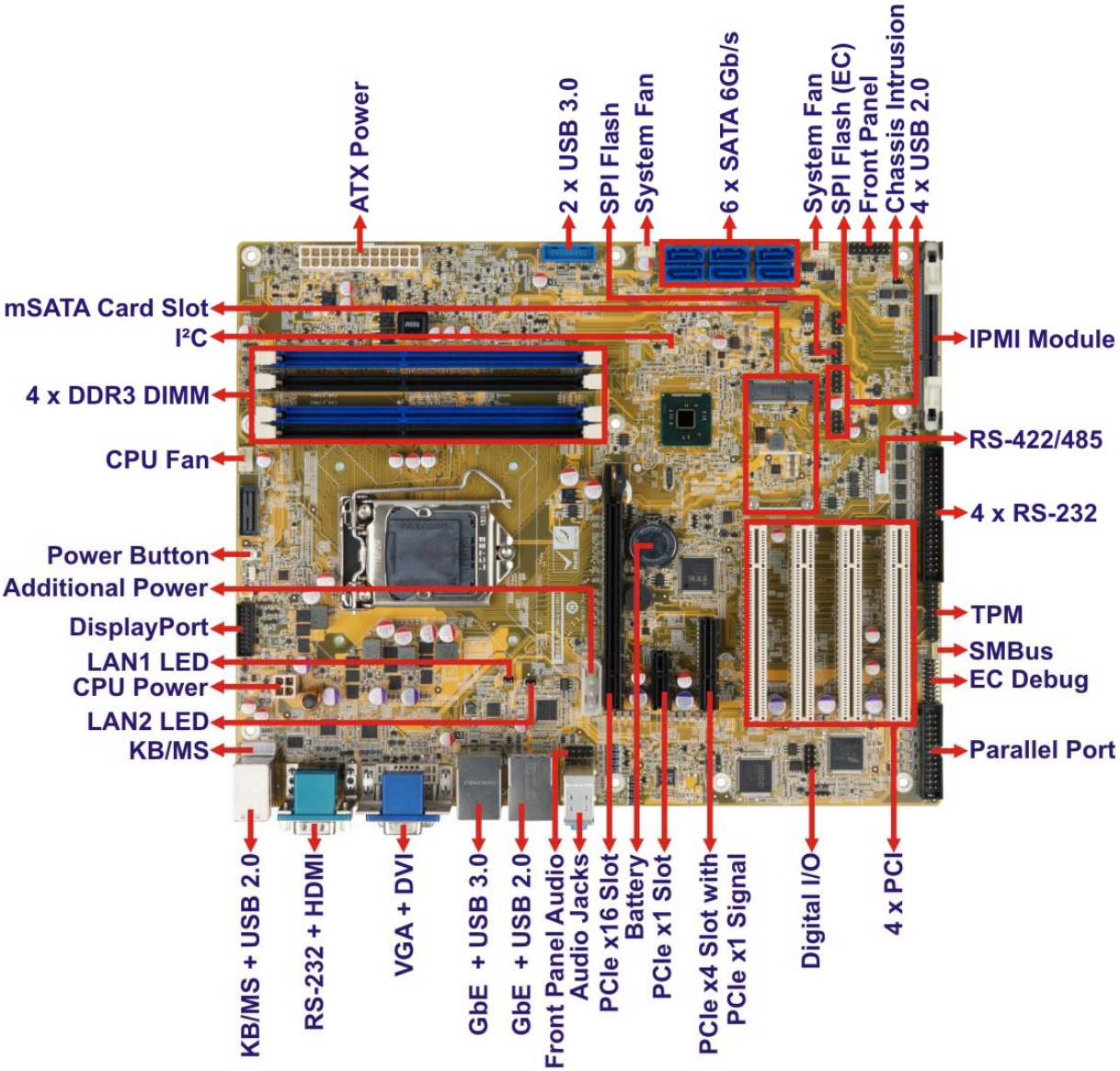


Figure 1-2: IMBA-Q870-i2 Connectors

1.5 Dimensions

The main dimensions of the IMBA-Q870-i2 are shown in the diagram below.

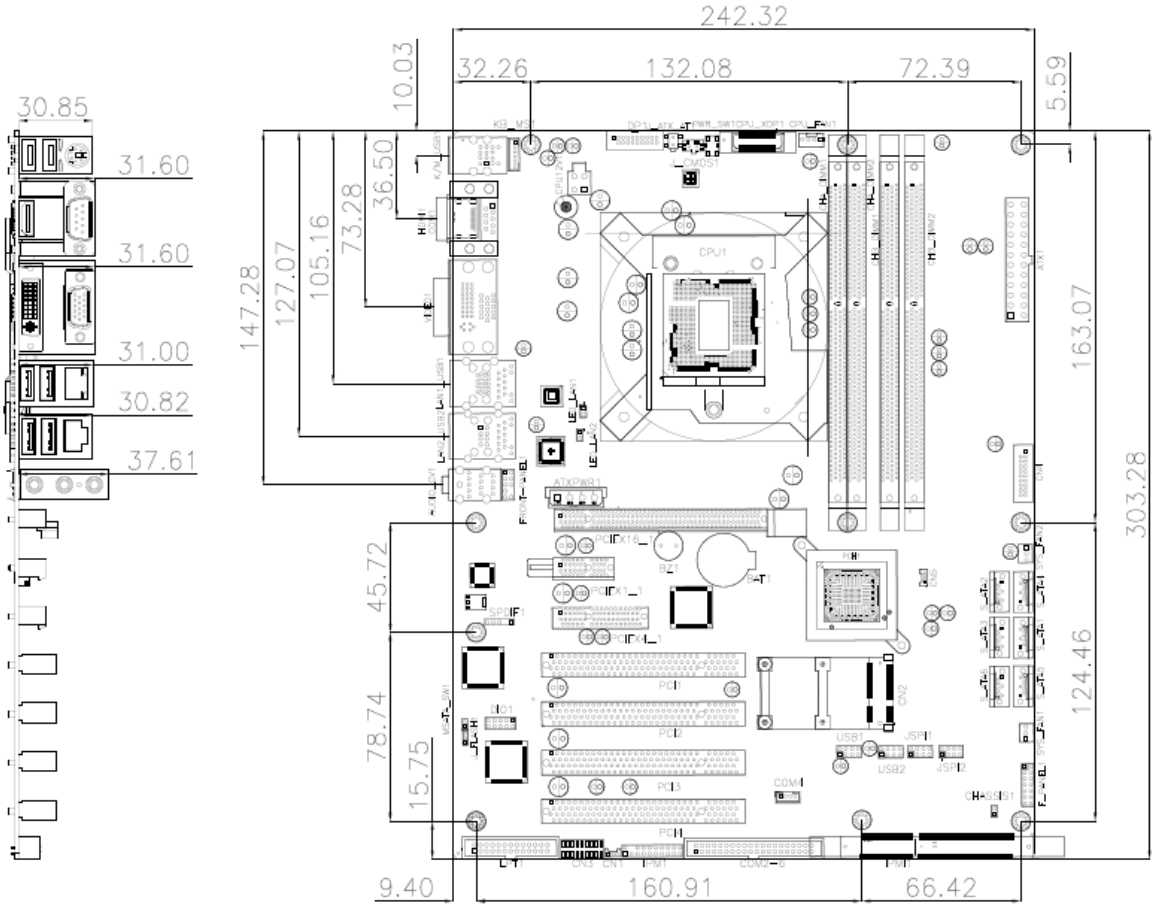


Figure 1-3: IMBA-Q870-i2 Dimensions (mm)

1.6 Data Flow

Figure 1-4 shows the data flow between the system chipset, the CPU and other components installed on the motherboard.

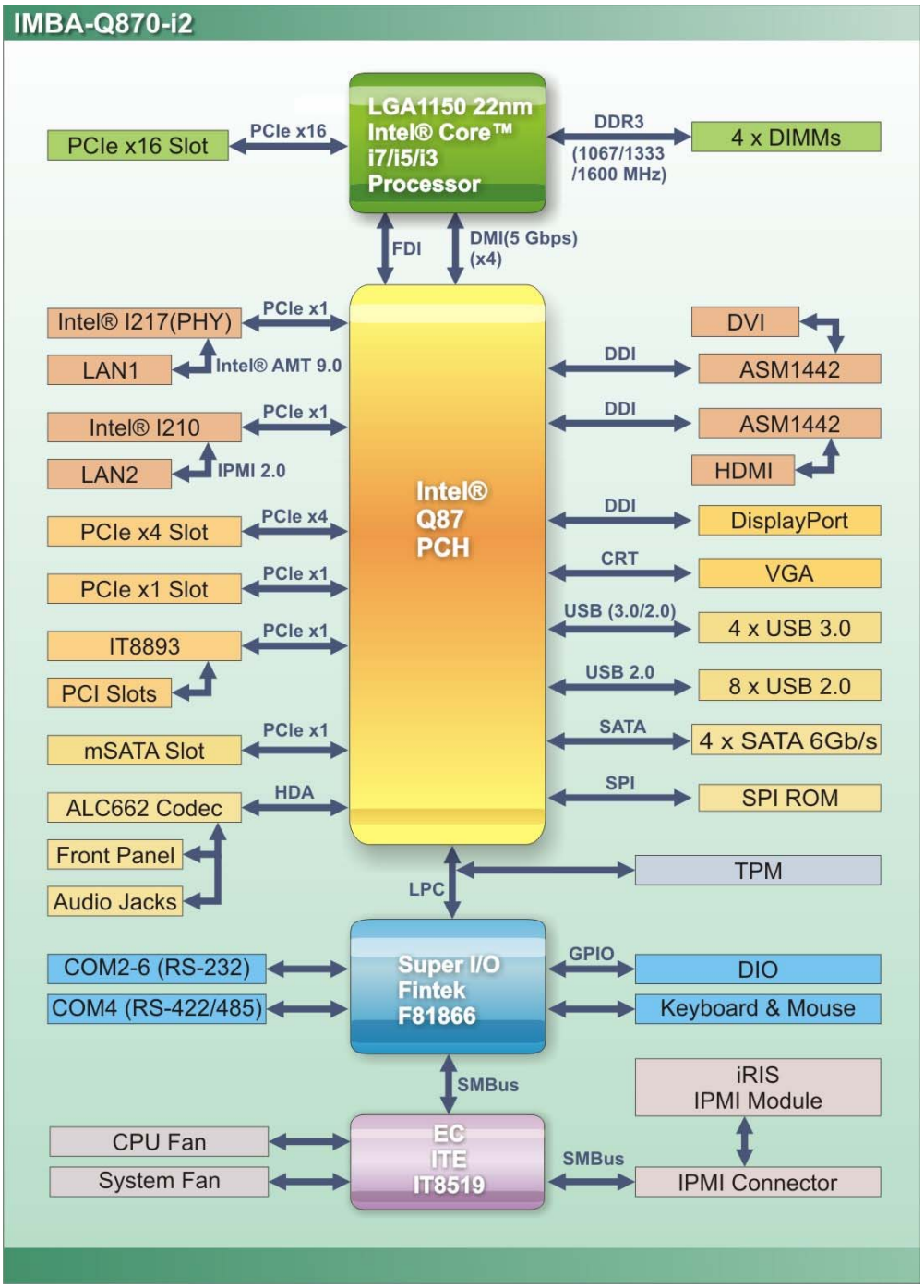


Figure 1-4: Data Flow Diagram

1.7 Technical Specifications

IMBA-Q870-i2 technical specifications are listed below.

Specification/Model	IMBA-Q870-i2
Form Factor	ATX
CPU Supported	LGA1150 Intel® Core™ i7, Core™ i5, Core™ i3, Pentium® or Celeron® processor supported
Chipset	Intel® Q87
Integrated Graphics	Intel® HD Graphics Gen 7.5 supports DirectX 11.1, OpenCL 1.2, OpenGL 3.2, Full MPEG2, VC1, AVC Decode
Memory	Four 240-pin 1333/1066 MHz dual-channel DDR3 SDRAM DIMMs support up to 32.0 GB maximum
Audio	Realtek ALC662 HD Audio codec (line-in, line-out, mic-in)
BIOS	UEFI BIOS
Digital I/O	8-bit, 4-bit input/4-bit output
Ethernet Controllers	**LAN1:** Intel® I217 PHY with Intel® AMT 9.0 support **LAN2**: Intel® I210 PCIe Ethernet controller
Super I/O Controller	Fintek F81866
Watchdog Timer	Software programmable supports 1~255 sec. system reset
Expansion	
PCI	Four PCI slots
PCIe	One PCIe x1 slot One PCIe x16 slot One PCIe x4 slot (with x1 signal) One PCIe Mini slot for mSATA card or USB devices only
I/O Interface Connectors	
Audio Connectors	One external audio jack (line-in, line-out, mic-in) One internal front panel audio connector (2x5 pin header)

Specification/Model	IMBA-Q870-i2
Display Ports	One HDMI integrated in the Intel® Q87 (up to 2560x1600, 60Hz) One DVI-D integrated in the Intel® Q87 (up to 2560x1600, 60Hz) One VGA integrated in the Intel® Q87 (up to 1920x1200, 60Hz) One internal DisplayPort integrated in the Intel® Q87 supports HDMI, LVDS, VGA, DVI, DisplayPort (up to 3840x2160, 60Hz)
Ethernet	Two RJ-45 GbE ports
Keyboard/Mouse	One internal keyboard and mouse connector One PS/2 keyboard and mouse connector
TPM	One TPM connector via 20-pin header
Serial Ports	One external RS-232 serial port One RS-422/485 via internal wafer connector Four RS-232 via internal box headers
USB ports	Two external USB 3.0 ports on rear IO Two internal USB 3.0 ports by pin headers Four external USB 2.0 ports on rear IO Four internal USB 2.0 ports by pin headers
Serial ATA	Six SATA 6Gb/s connectors support RAID 0, 1, 5, 10
LAN LED	Two 2-pin LAN active LED connectors
Environmental and Power Specifications	
Power Supply	ATX power supported
Power Consumption	3.3V@0.66A, 5V@4.34A , 12V@0.16A, Vcore@4.01A, 5VSB@0.21A (2.60GHz Intel® CPU with four 2GB 1333MHz DDR3 DIMMs)
Operating Temperature	-20ºC ~ 60ºC/-4˚F ~ 140˚F
Humidity	5% ~ 95% (non-condensing)
Physical Specifications	
Dimensions	244 mm x 305 mm
Weight GW/NW	1200 g / 700 g

Table 1-1: IMBA-Q870-i2 Specifications

Chapter

2

Packing List

2.1 Anti-static Precautions

WARNING!

Static electricity can destroy certain electronics. Make sure to follow the ESD precautions to prevent damage to the product, and injury to the user.

Make sure to adhere to the following guidelines:

- ***Wear an anti-static wristband***: Wearing an anti-static wristband can prevent electrostatic discharge.
- ***Self-grounding***: Touch a grounded conductor every few minutes to discharge any excess static buildup.
- ***Use an anti-static pad***: When configuring any circuit board, place it on an anti-static mat.
- ***Only handle the edges of the PCB***: Don't touch the surface of the motherboard. Hold the motherboard by the edges when handling.

2.2 Unpacking Precautions

When the IMBA-Q870-i2 is unpacked, please do the following:

- Follow the antistatic guidelines above.
- Make sure the packing box is facing upwards when opening.
- Make sure all the packing list items are present.

2.3 Packing List

NOTE:

If any of the components listed in the checklist below are missing, do not proceed with the installation. Contact the IEI reseller or vendor the IMBA-Q870-i2 was purchased from or contact an IEI sales representative directly by sending an email to sales@iei.com.tw.

The IMBA-Q870-i2 is shipped with the following components:

Quantity	Item and Part Number	Image
1	IMBA-Q870-i2 single board computer	
2	SATA cable (**P/N**: 32000-062800-RS)	
1	I/O shielding (**P/N**: 45014-0046C0-00-RS)	
1	Mini jumper pack (2.54mm) (**P/N**: 33101-000656-RS)	
1	Utility CD	

Quantity	Item and Part Number	Image
1	Quick Installation Guide	

Table 2-1: Packing List

2.4 Optional Items

The following are optional components which may be separately purchased:

Item and Part Number	Image
Dual-port USB cable with bracket (**P/N**: 19800-003100-200-RS)	
Dual-port USB 3.0 cable with bracket (**P/N**: 19800-010500-100-RS)	
SATA Power Cable (**P/N**: 32102-000100-200-RS)	
RS-422/485 cable, 200mm (**P/N**: 32205-003800-100-RS)	
Dual RS-232 cable (**P/N**: 19800-000051-RS)	
KB/MS cable (**P/N**: 19800-000075-RS)	
Parallel port cable (**P/N**:19800-000049-RS)	

Item and Part Number	Image
LGA1155/LGA1156 cooler kit (1U chassis compatible, 73W) (**P/N**: CF-1156A-RS-R11)	
LGA1155/LGA1156 cooler kit (95W) (**P/N**: CF-1156E-RS-R11)	
DisplayPort to HDMI converter board for IEI IDP connector (**P/N**: DP-HDMI-R10)	
DisplayPort to 24-bit dual-channel LVDS converter board for iEi IDP connector (**P/N**: DP-LVDS-R10)	
DisplayPort to VGA converter board for iEi IDP connector (**P/N**: DP-VGA-R10)	
DisplayPort to DVI-D converter board for iEi IDP connector (**P/N**: DP-DVI-R10)	
20-pin Infineon TPM Module, S/W management tool, firmware V3.17 (**P/N**: TPM-IN01-R11)	

Table 2-2: Optional Items

Chapter

3

Connectors

3.1 Peripheral Interface Connectors

This chapter details all the jumpers and connectors.

3.1.1 IMBA-Q870-i2 Layout

The figures below show all the connectors and jumpers.

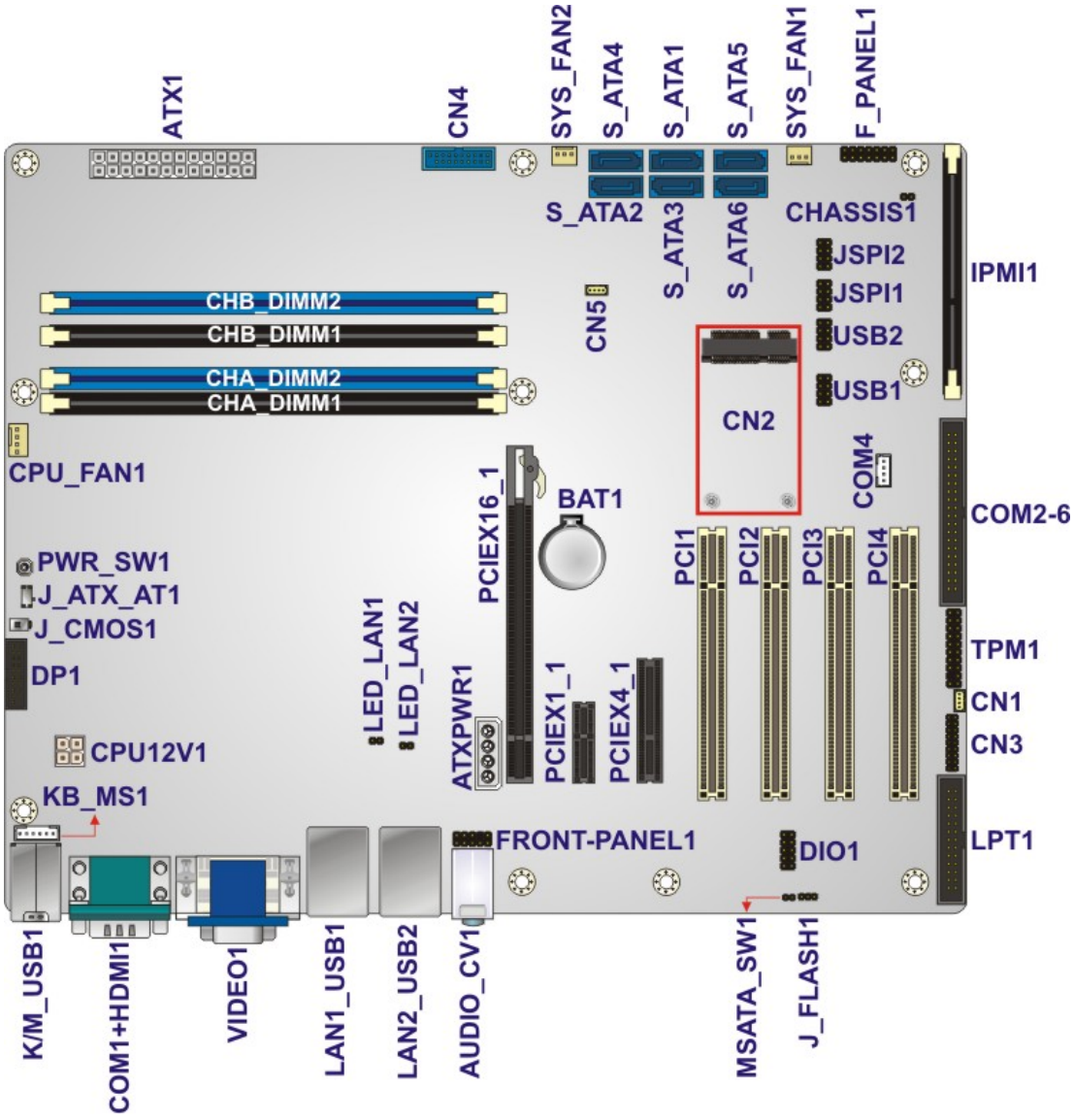


Figure 3-1: Connectors and Jumpers

3.1.2 Peripheral Interface Connectors

The table below lists all the connectors on the board.

Connector	Type	Label
Additional power connector	4-pin connector	ATXPWR1
ATX power connector	24-pin connector	ATX1
Battery connector	Battery holder	BAT1
Chassis intrusion connector	2-pin header	CHASSIS1
CPU power connector	4-pin connector	CPU12V1
Digital I/O connector	10-pin header	DIO1
DisplayPort connector	19-pin box header	DP1
EC debug connector	18-pin header	CN3
Fan connector (CPU)	4-pin wafer	CPU_FAN1
Fan connectors (system)	3-pin wafer	SYS_FAN1, SYS_FAN2
Front panel audio connector	10-pin header	FRONT-PANEL1
Front panel connector	14-pin header	F_PANEL1
I^2C connector	4-pin wafer	CN5
iRIS module connector	204-pin SO-DIMM slot	IPMI1
Keyboard and mouse connector	6-pin wafer	KB_MS1
LAN1 LED connector	2-pin header	LED_LAN1
LAN2 LED connector	2-pin header	LED_LAN2
Memory card slot	DIMM slot	CHA_DIMM1, CHA_DIMM2, CHB_DIMM1, CHB_DIMM2
mSATA card slot	PCIe Mini socket	CN2
Parallel port connector	26-pin box header	LPT1
PCI slot	PCI slot	PCI1, PCI2, PCI3, PCI4
PCIe x1 slot	PCIe x1 slot	PCIEX1_1
PCIe x16 slot	PCIe x16 slot	PCIEX16_1

Connector	Type	Label
PCIe x4 slot with PCIe x1 signal	PCIe x4 slot	PCIEX4_1
Power button	Push button	PWR_SW1
SATA 6Gb/s drive connectors	7-pin SATA connector	S_ATA1, S_ATA2, S_ATA3, S_ATA 4, S_ATA5, S_ATA 6
Serial port, RS-232	40-pin box header	COM2-6
Serial port, RS-422/485	4-pin wafer	COM4
SMBus connector	4-pin wafer	CN1
SPI flash connector	8-pin header	JSPI1
SPI flash connector, EC	8-pin header	JSPI2
TPM connector	20-pin header	TPM1
USB 2.0 connectors	8-pin headers	USB1, USB2
USB 3.0 connector	19-pin box header	CN4

Table 3-1: Peripheral Interface Connectors

3.1.3 External Interface Panel Connectors

The table below lists the connectors on the external I/O panel.

Connector	Type	Label
Audio connector	Audio jacks	AUDIO_CV1
Keyboard/Mouse and USB 2.0 ports	PS/2, USB 2.0	K/M_USB1
Ethernet and USB 2.0 ports	RJ-45, USB 2.0	LAN2_USB2
Ethernet and USB 3.0 ports	RJ-45, USB 3.0	LAN1_USB1
HDMI connector	HDMI port	HDMI1
Serial Port connector (COM1)	9-pin male DB-9	COM1
VGA and DVI connector	15-pin female, 24-pin female	VIDEO1

Table 3-2: Rear Panel Connectors

3.2 Internal Peripheral Connectors

The section describes all of the connectors on the IMBA-Q870-i2.

3.2.1 Additional Power Connector

CN Label: **ATXPWR1**

CN Type: 4-pin connector

CN Location: See **Figure 3-2**

CN Pinouts: See **Table 3-3**

The additional power connector provides extra +12V and +5V power to the system.

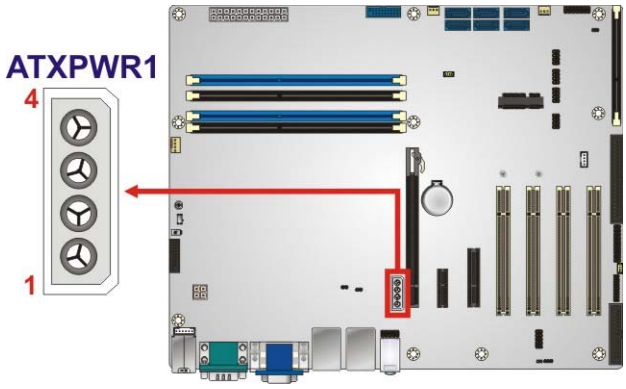


Figure 3-2: Additional Power Connector Location

Pin	Description
1	+12V
2	GND
3	GND
4	+5V

Table 3-3: Additional Power Connector Pinouts

3.2.2 ATX Power Connector

CN Label: **ATX1**

CN Type: 24-pin ATX

CN Location: See **Figure 3-3**

CN Pinouts: See **Table 3-4**

The ATX power connector connects to an ATX power supply.

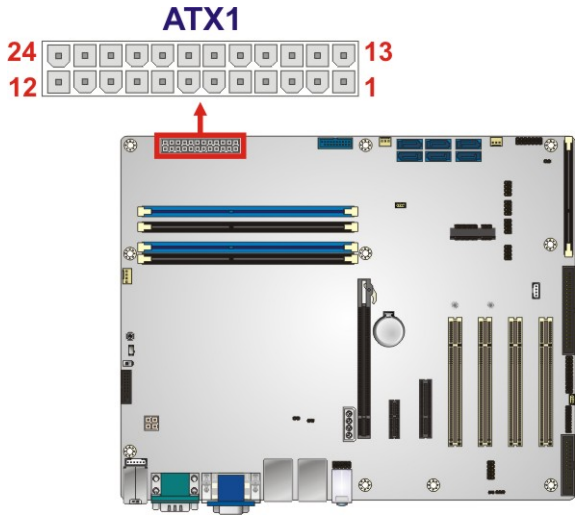


Figure 3-3: ATX Power Connector Location

Pin	Description	Pin	Description
1	+3.3V	13	+3.3V
2	+3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS_ON
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	Power good	20	-5V
9	5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	+3.3V	24	GND

Table 3-4: ATX Power Connector Pinouts

3.2.3 Battery Connector

CAUTION:

Risk of explosion if battery is replaced by an incorrect type. Only certified engineers should replace the on-board battery.

Dispose of used batteries according to instructions and local regulations.

CN Label:	**BAT1**
CN Type:	Battery holder
CN Location:	See **Figure 3-4**
CN Pinouts:	See **Table 3-5**

A system battery is placed in the battery holder. The battery provides power to the system clock to retain the time when power is turned off.

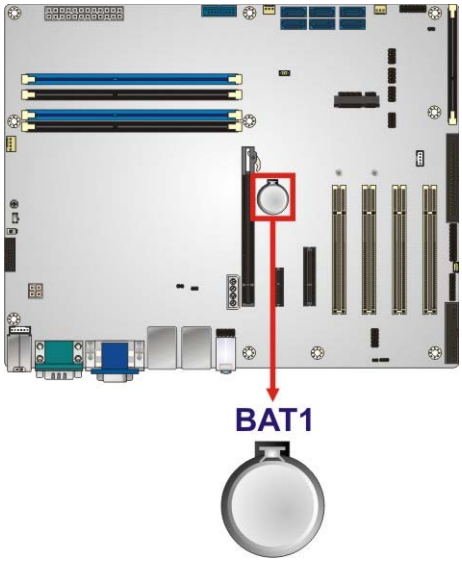


Figure 3-4: Battery Connector Location

Pin	Description
1	NC

Pin	Description
2	BAT+
3	BAT-(GND)

Table 3-5: Battery Connector Pinouts

3.2.4 Chassis Intrusion Connector

CN Label: **CHASSIS1**

CN Type: 2-pin header

CN Location: See **Figure 3-5**

CN Pinouts: See **Table 3-6**

The chassis intrusion connector is for a chassis intrusion detection sensor or switch that detects if a chassis component is removed or replaced.

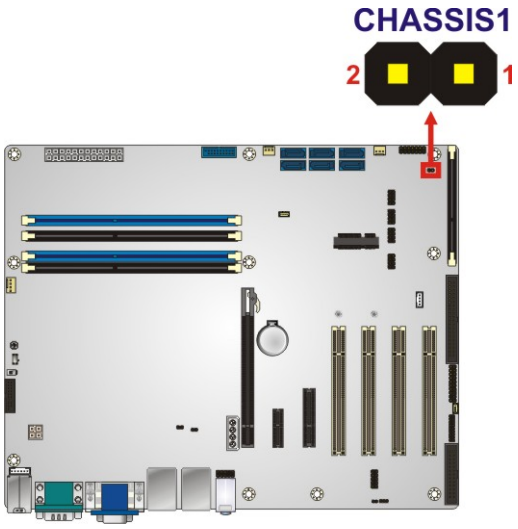


Figure 3-5: Chassis Intrusion Connector Location

Pin	Description
1	+3.3VSB
2	CHASSIS OPEN

Table 3-6: Chassis Intrusion Connector Pinouts

3.2.5 CPU Power Connector

CN Label: **CPU12V1**

CN Type: 4-pin connector

CN Location: See **Figure 3-6**

CN Pinouts: See **Table 3-7**

The CPU power input connector provides power to the CPU.

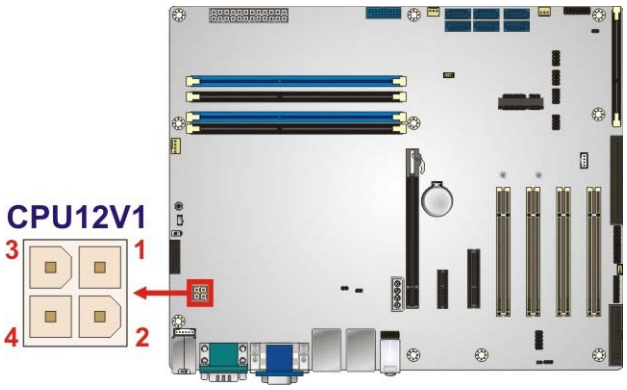


Figure 3-6: CPU Power Connector Location

PIN NO.	DESCRIPTION
1	GND
2	GND
3	+12V
4	+12V

Table 3-7: CPU Power Connector Pinouts

3.2.6 DisplayPort Connector

CN Label: **DP1**

CN Type: 19-pin box header

CN Location: See **Figure 3-7**

CN Pinouts: See **Table 3-8**

The DisplayPort connector supports HDMI, LVDS, VGA, DVI and DisplayPort graphics interfaces with up to 3840x2160 resolutions.

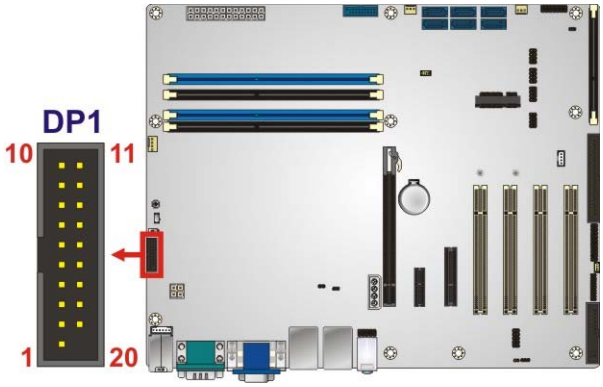


Figure 3-7: DisplayPort Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	11	AUXP
2	LANE1N	12	AUXN
3	LANE1P	13	GND
4	GND	14	LANE2P
5	LANE3N	15	LANE2N
6	LANE3P	16	GND
7	GND	17	LANE0P
8	AUX_CTRL_DET_D	18	LANE0N
9	GND	19	+3.3V
10	HPD		

Table 3-8: DisplayPort Connector Pinouts

3.2.7 Digital I/O Connector

CN Label: **DIO1**

CN Type: 10-pin header

CN Location: See **Figure 3-8**

CN Pinouts: See **Table 3-9**

The digital I/O connector provides programmable input and output for external devices. The digital I/O provides 4-bit output and 4-bit input.

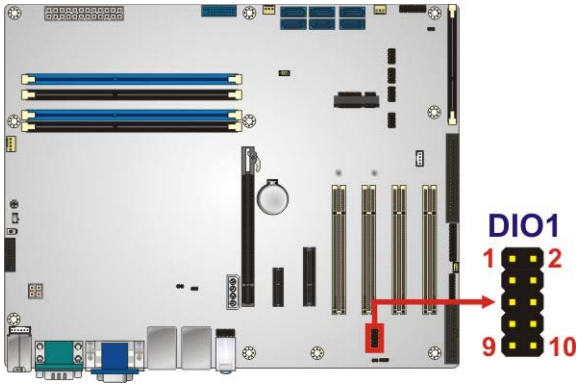


Figure 3-8: Digital I/O Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	VCC
3	Output 3	4	Output 2
5	Output 1	6	Output 0
7	Input 3	8	Input 2
9	Input 1	10	Input 0

Table 3-9: Digital I/O Connector Pinouts

3.2.8 EC Debug Connector

CN Label: **CN3**

CN Type: 18-pin header

CN Location: See **Figure 3-9**

CN Pinouts: See **Table 3-10**

The EC debug connector is used for EC debug.

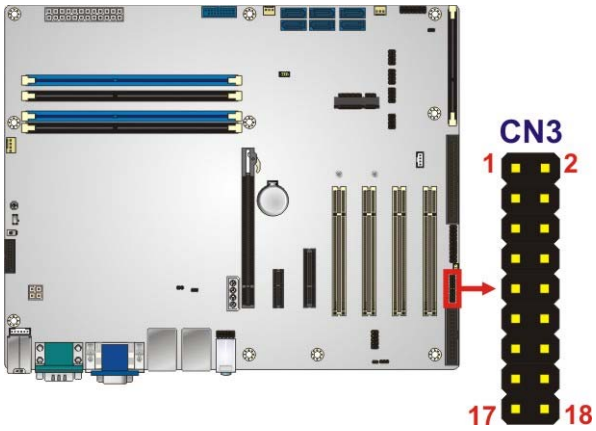


Figure 3-9: EC Debug Connector Location

Pin	Description	Pin	Description
1	EC_EPP_STB#	2	EC_EPP_AFD#
3	EC_EPP_PD0	4	NC
5	EC_EPP_PD1	6	EC_EPP_INIT#
7	EC_EPP_PD2	8	EC_EPP_SLIN#
9	EC_EPP_PD3	10	GND
11	EC_EPP_PD4	12	NC
13	EC_EPP_PD5	14	EC_EPP_BUSY
15	EC_EPP_PD6	16	EC_EPP_KSI5
17	EC_EPP_PD7	18	EC_EPP_KSI4

Table 3-10: EC Debug Connector Pinouts

3.2.9 Fan Connector (CPU)

CN Label: **CPU_FAN1**

CN Type: 4-pin wafer

CN Location: See **Figure 3-10**

CN Pinouts: See **Table 3-11**

The fan connector attaches to a CPU cooling fan.

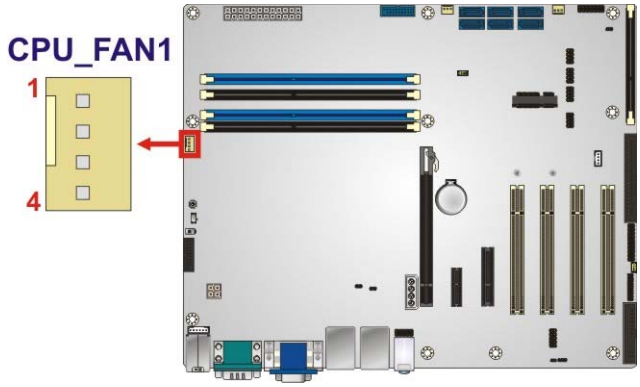


Figure 3-10: CPU Fan Connector Location

PIN NO.	DESCRIPTION
1	GND
2	+12 V
3	FANIO
4	PWM

Table 3-11: CPU Fan Connector Pinouts

3.2.10 Fan Connectors (System)

CN Label: **SYS_FAN1, SYS_FAN2**

CN Type: 3-pin wafer

CN Location: See **Figure 3-11**

CN Pinouts: See **Table 3-12**

Each fan connector attaches to a system cooling fan.

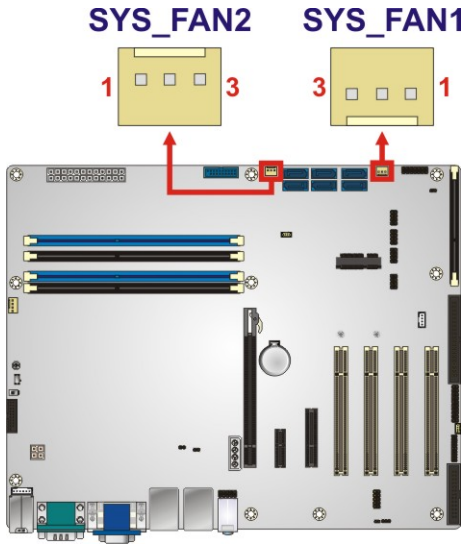


Figure 3-11: System Fan Connector Locations

PIN NO.	DESCRIPTION
1	FANIO
2	+12 V (PWM)
3	GND

Table 3-12: System Fan Connector Pinouts

3.2.11 Front Panel Audio Connector

CN Label: **FRONT-PANEL1**

CN Type: 10-pin header

CN Location: See **Figure 3-12**

CN Pinouts: See **Table 3-13**

This connector connects to speakers, a microphone and an audio input.

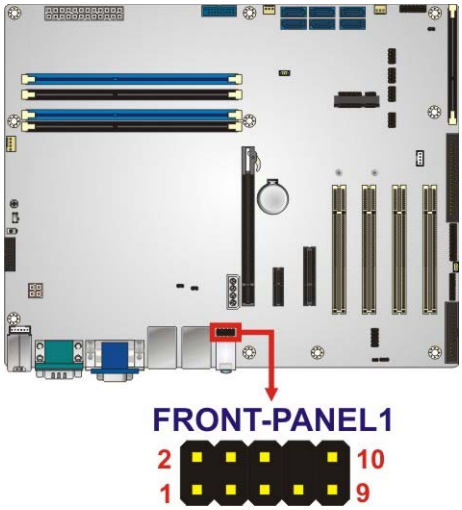


Figure 3-12: Front Panel Audio Connector Location

Pin	Description	Pin	Description
1	MIC2-L	2	GND
3	MIC2-R	4	Presence#
5	LINE2-R	6	MIC2-JD
7	FRONT-IO	8	NC
9	LINE2-L	10	LINE2-JD

Table 3-13: Front Panel Audio Connector Pinouts

3.2.12 Front Panel Connector

CN Label: **F_PANEL1**

CN Type: 14-pin header

CN Location: See **Figure 3-13**

CN Pinouts: See **Table 3-14**

The front panel connector connects to the indicator LEDs and buttons on the computer's front panel.

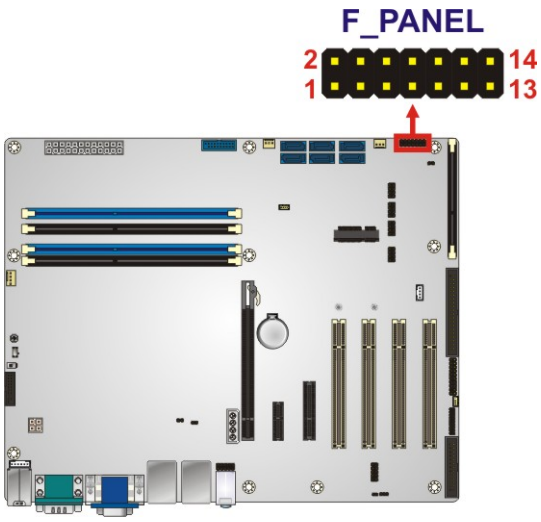


Figure 3-13: Front Panel Connector Location

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power LED	1	+5V	Speaker	2	Beep Power
	3	NC	IPMI LED	4	IPMI ID_LED+
	5	GND		6	IPMI ID_LED-
Power Button	7	PWRBT_SW#	Speaker	8	PC Beep
	9	GND		10	NC
HDD LED	11	+5V	Reset	12	EXTRST-
	13	SATA_LED#		14	GND

Table 3-14: Front Panel Connector Pinouts

3.2.13 I²C Connector

CN Label: **CN5**

CN Type: 4-pin wafer

CN Location: See **Figure 3-14**

CN Pinouts: See **Table 3-15**

The I²C connector is used to connect I²C-bus devices to the mainboard.

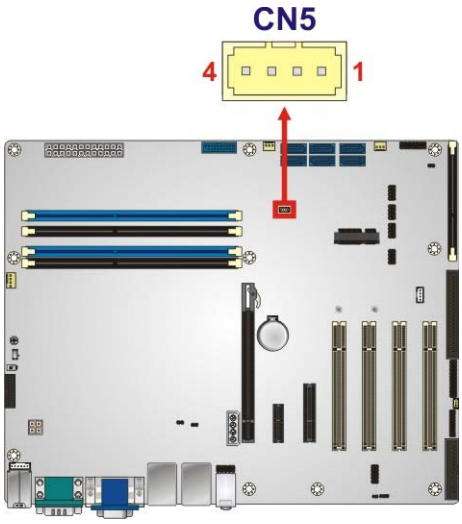


Figure 3-14: I²C Connector Location

Pin	Description
1	GND
2	PCH_GP38
3	PCH_GP39
4	+5V

Table 3-15: I²C Connector Pinouts

3.2.14 iRIS Module Slot

CN Label: **IPMI1**

CN Type: 204-pin DDR3 SO-DIMM slot

CN Location: See **Figure 3-15**

The iRIS module slot is used to install the IEI iRIS-2400 IPMI 2.0 module. Please refer to **Section 4.7** for IPMI setup procedure.

WARNING:

The iRIS module slot is designed to install the IEI iRIS-2400 IPMI 2.0 module only. DO NOT install other modules into the iRIS module slot. Doing so may cause damage to the IMBA-Q870-i2.

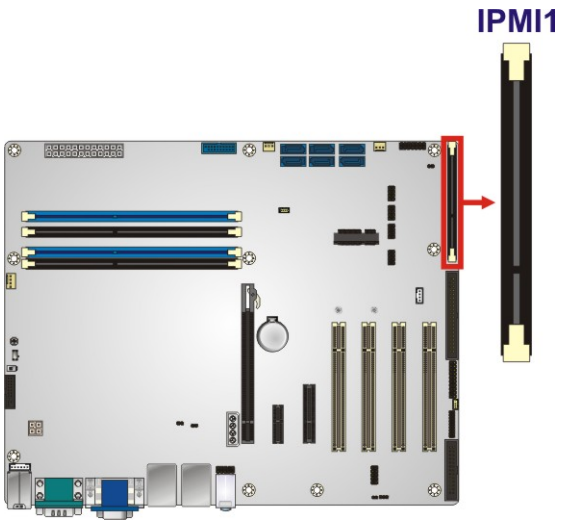


Figure 3-15: iRIS Module Slot Location

3.2.15 Keyboard and Mouse Connector

CN Label:	**KB_MS1**
CN Type:	6-pin wafer
CN Location:	See **Figure 3-16**
CN Pinouts:	See **Table 3-16**

The keyboard/mouse connector connects to a PS/2 Y-cable that can be connected to a PS/2 keyboard and mouse.

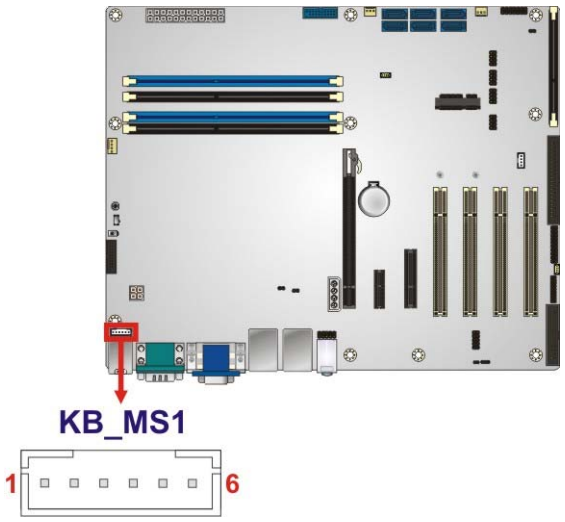


Figure 3-16: Keyboard and Mouse Location

Pin	Description
1	VCC
2	Mouse Data
3	Mouse Clock
4	Keyboard Data
5	Keyboard Clock
6	GND

Table 3-16: Keyboard and Mouse Connector Pinouts

3.2.16 LAN LED Connectors

CN Label: **LED_LAN1, LED_LAN2**

CN Type: 2-pin header

CN Location: See **Figure 3-17**

CN Pinouts: See **Table 3-17** and **Table 3-18**

The LAN LED connectors are used to connect to the LAN LED indicators on the chassis to indicate users the link activities of the two LAN ports.

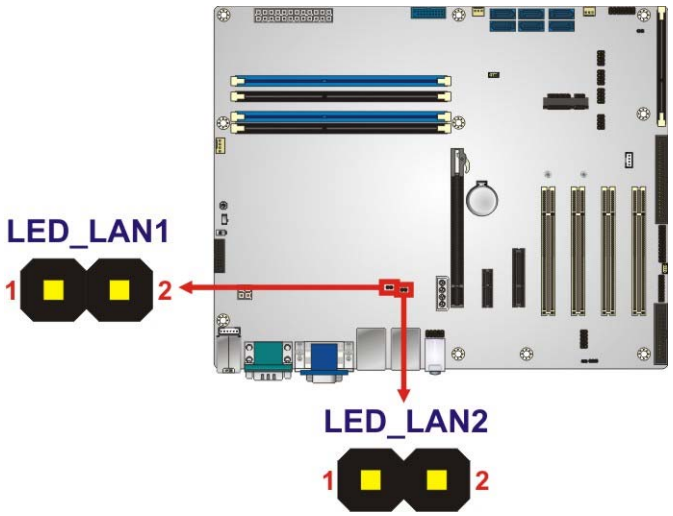


Figure 3-17: LAN LED Connector Locations

Pin	Description
1	+3.3V
2	LAN1_LED_LINK#_ACT

Table 3-17: LAN1 LED Connector (LED_LAN1) Pinouts

Pin	Description
1	+3.3V
2	LAN2_LED_LINK#_ACT

Table 3-18: LAN2 LED Connector (LED_LAN2) Pinouts

3.2.17 Memory Card Slots

CN Label: **CHA_DIMM1, CHA_DIMM2, CHB_DIMM1, CHB_DIMM2**

CN Type: DDR3 DIMM slot

CN Location: See **Figure 3-18**

The DIMM slots are for DDR3 DIMM memory modules.

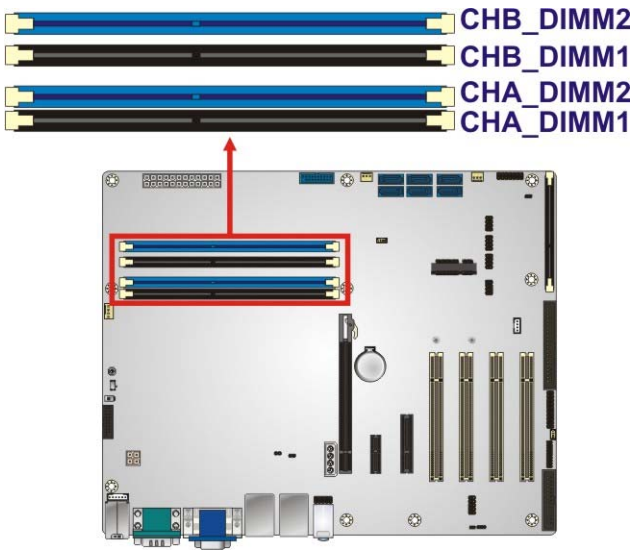


Figure 3-18: Memory Card Slot Locations

3.2.18 mSATA Card Slot

CN Label:	**CN2**
CN Type:	PCIe Mini slot
CN Location:	See **Figure 3-19**
CN Pinouts:	See **Table 3-19**

The mSATA card slot is for installing mSATA cards or USB devices only.

NOTE:

If the user shorts the mSATA Slot Setup jumper (MSATA_SW1) to force the system to enable mSATA device, the S_ATA6 connector will be disabled. Please refer to **Section 4.3.4**.

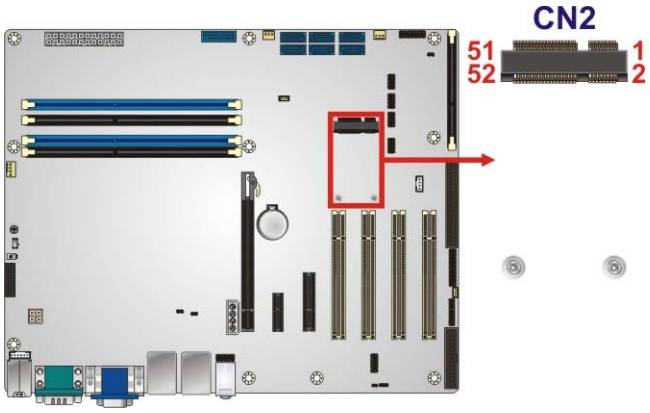


Figure 3-19: mSATA Card Slot Location

Pin	Description	Pin	Description
1	PCIE_WAKE#	2	+3.3V
3	N/C	4	GND
5	N/C	6	1.5V
7	N/C	8	N/C
9	GND	10	N/C
11	MSATA_CLK#	12	N/C
13	MSATA _CLK	14	N/C
15	GND	16	N/C
17	PLTRST_N	18	GND
19	N/C	20	+3.3V
21	GND	22	PLTRST_N
23	SATA_RX+	24	+3.3V
25	SATA_RX-	26	GND
27	GND	28	1.5V
29	GND	30	SMB_CLK
31	SATA_TX-	32	SMB_DATA
33	SATA_TX+	34	GND
35	GND	36	USB_DATA-
37	GND	38	USB_DATA+
39	+3.3V	40	GND
41	+3.3V	42	N/C

Pin	Description	Pin	Description
43	+3.3V	44	N/C
45	CLINK_CLK	46	N/C
47	CLINK_DATA	48	1.5V
49	CLINK_RST#	50	GND
51	MSATA_DET	52	+3.3V

Table 3-19: mSATA Card Slot Pinouts

3.2.19 Parallel Port Connector

CN Label: **LPT1**

CN Type: 26-pin box header

CN Location: See **Figure 3-20**

CN Pinouts: See **Table 3-20**

The parallel port connector connects to a parallel port connector interface or some other parallel port device such as a printer.

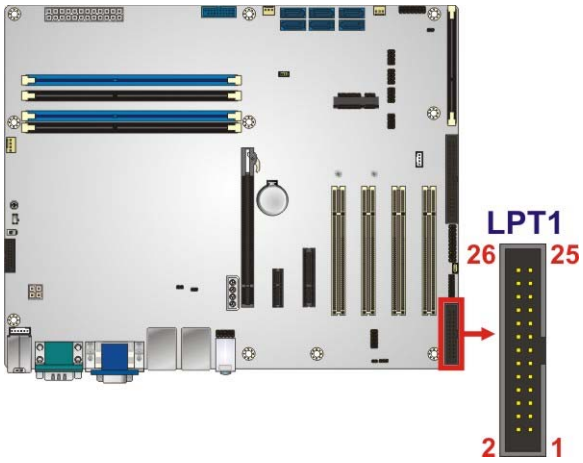


Figure 3-20: Parallel Port Connector Location

Pin	Description	Pin	Description
1	STROBE#	2	DATA 0
3	DATA 1	4	DATA 2
5	DATA 3	6	DATA 4

Pin	Description	Pin	Description
7	DATA 5	8	DATA 6
9	DATA 7	10	ACKNOWLEDGE#
11	BUSY	12	PAPER EMPTY
13	PRINTER SELECT	14	AUTO FORM FEED #
15	ERROR#	16	INITIALIZE#
17	PRINTER SELECT LN#	18	GROUND
19	GROUND	20	GROUND
21	GROUND	22	GROUND
23	GROUND	24	GROUND
25	GROUND	26	NC

Table 3-20: Parallel Port Connector Pinouts

3.2.20 Power Button

CN Label: **PWR_SW1**

CN Type: Push button

CN Location: See **Figure 3-21**

The on-board power button controls system power.

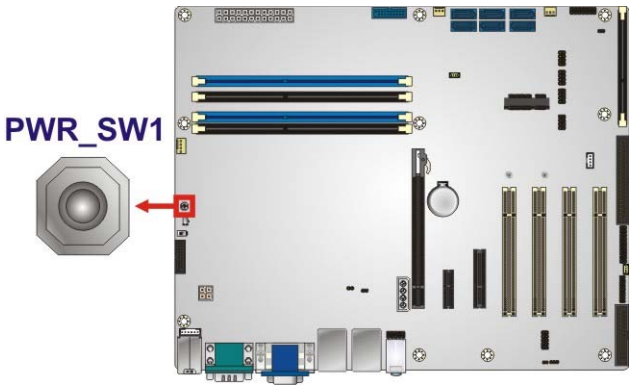


Figure 3-21: Power Button Location

3.2.21 SATA 6Gb/s Drive Connectors

CN Label: **S_ATA1, S_ATA2, S_ATA3, S_ATA4, S_ATA5, S_ATA6**

CN Type: 7-pin SATA drive connectors

CN Location: See **Figure 3-22**

CN Pinouts: See **Table 3-21**

The SATA drive connectors can be connected to SATA drives.

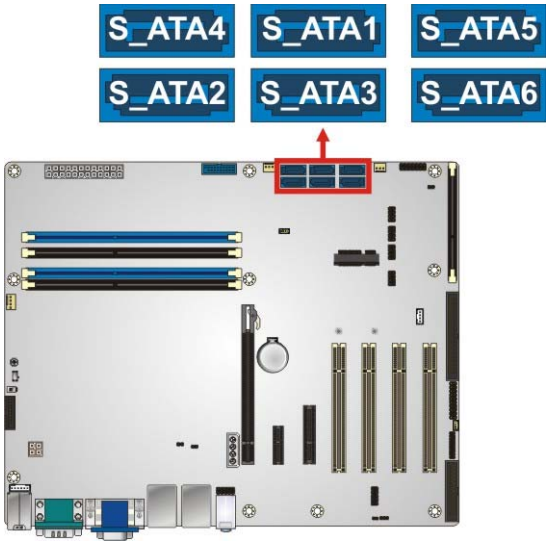


Figure 3-22: SATA 6Gb/s Drive Connector Locations

Pin	Description
1	GND
2	SATA_TX+
3	SATA_TX-
4	GND
5	SATA_RX-
6	SATA_RX+
7	GND

Table 3-21: SATA 6Gb/s Drive Connector Pinouts

NOTE:

If the user shorts the mSATA Slot Setup jumper (MSATA_SW1) to force the system to enable mSATA device, the S_ATA6 connector will be disabled. Please refer to **Section 4.3.4**.

3.2.22 Serial Port Connectors, RS-232

CN Label:	**COM2-6**
CN Type:	40-pin box header
CN Location:	See **Figure 3-23**
CN Pinouts:	See **Table 3-22**

The connector provides four RS-232 ports connection.

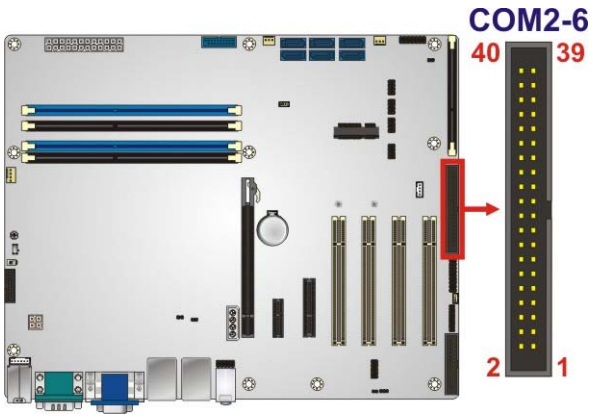


Figure 3-23: Serial Port Connector Location

	PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
COM2	1	DCD	2	DSR
	3	RXD	4	RTS
	5	TXD	6	CTS
	7	DTR	8	RI
	9	GND	10	GND
	11	DCD	12	DSR

	PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
COM3	13	RXD	14	RTS
	15	TXD	16	CTS
	17	DTR	18	RI
	19	GND	20	GND
COM5	21	DCD	22	DSR
	23	RXD	24	RTS
	25	TXD	26	CTS
	27	DTR	28	RI
	29	GND	30	GND
COM6	31	DCD	32	DSR
	33	RXD	34	RTS
	35	TXD	36	CTS
	37	DTR	38	RI
	39	GND	40	GND

Table 3-22: COM3~6 Serial Port Connector Pinouts

3.2.23 Serial Port Connector, RS-422/485

CN Label: **COM4**

CN Type: 4-pin wafer

CN Location: See **Figure 3-24**

CN Pinouts: See **Table 3-23**

Used for RS-422/485 communications.

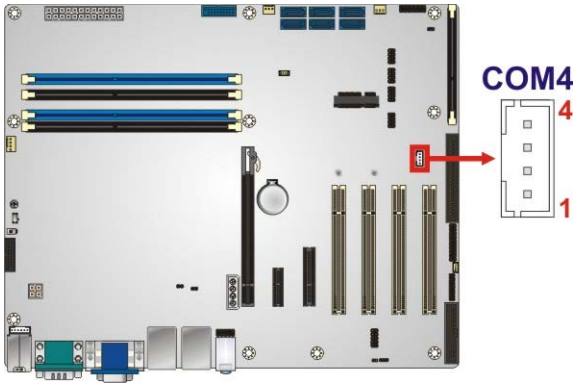


Figure 3-24: RS-422/485 Connector Location

PIN NO.	DESCRIPTION
1	RXD422-
2	RXD422+
3	TXD422+/TXD485+
4	TXD422-/TXD485-

Table 3-23: RS-422/485 Connector Pinouts

Use the optional RS-422/485 cable to connect to a serial device. The pinouts of the DB-9 connector are listed below.

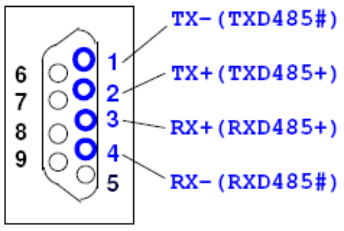
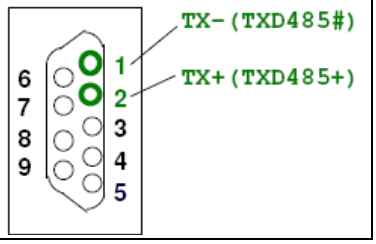
RS-422 Pinouts	RS-485 Pinouts
	

Table 3-24: DB-9 RS-422/485 Pinouts

3.2.24 SMBus Connector

CN Label: **CN1**

CN Type: 4-pin wafer

CN Location: See **Figure 3-25**

CN Pinouts: See **Table 3-25**

The SMBus (System Management Bus) connector provides low-speed system management communications.

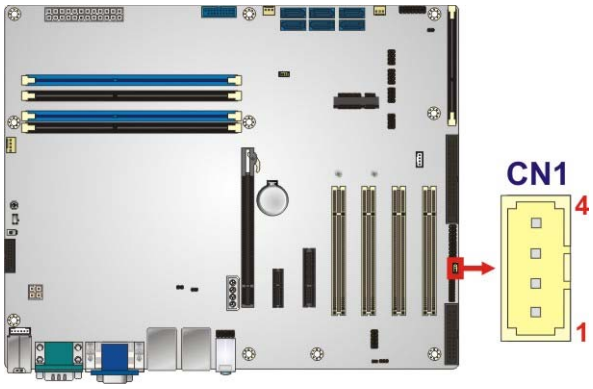


Figure 3-25: SMBus Connector Location

PIN	DESCRIPTION
1	GND
2	SMB_DATA
3	SMB_CLK
4	+5V

Table 3-25: SMBus Connector Pinouts

3.2.25 SPI Flash Connector

CN Label: **JSPI1**

CN Type: 8-pin header

CN Location: See **Figure 3-26**

CN Pinouts: See **Table 3-26**

The SPI flash connector is used to flash the SPI ROM.

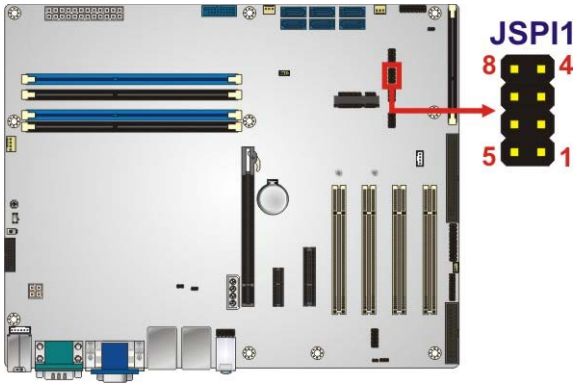


Figure 3-26: SPI Flash Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+3.3V	2	SPI_CS#
3	SPI_SO	4	NC
5	GND	6	SPI_CLK
7	SPI_SI	8	NC

Table 3-26: SPI Flash Connector Pinouts

3.2.26 SPI Flash Connector, EC

CN Label: **JSPI2**

CN Type: 8-pin header

CN Location: See **Figure 3-27**

CN Pinouts: See **Table 3-27**

The SPI flash connector is used to flash the EC ROM.

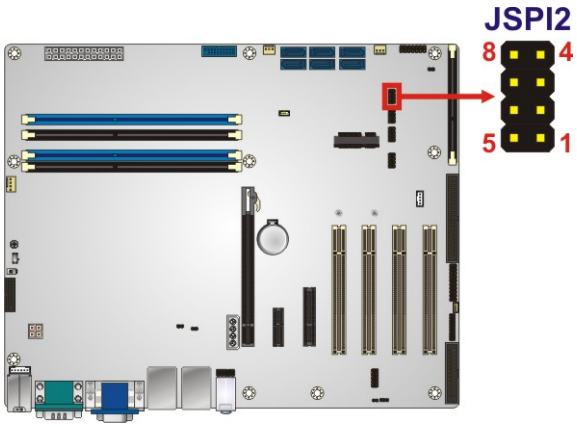


Figure 3-27: SPI EC Flash Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+3.3V	2	SPI_CS#
3	SPI_SO	4	NC
5	GND	6	SPI_CLK
7	SPI_SI	8	NC

Table 3-27: SPI EC Flash Connector Pinouts

3.2.27 TPM Connector

CN Label: **TPM1**

CN Type: 20-pin header

CN Location: See **Figure 3-28**

CN Pinouts: See **Table 3-28**

The TPM connector connects to a TPM module.

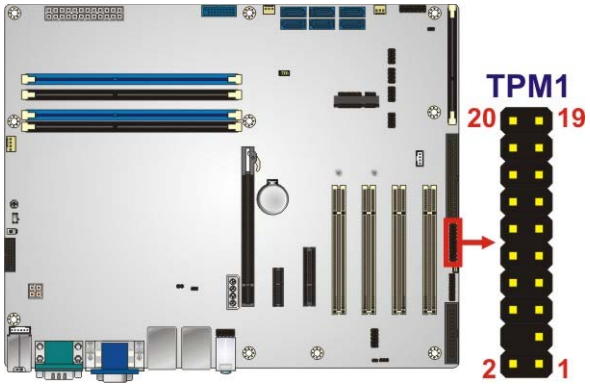


Figure 3-28: TPM Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LCLK	2	GND
3	LFRAME#	4	KEY
5	LRERST#	6	+5V
7	LAD3	8	LAD2
9	+3.3V	10	LAD1
11	LAD0	12	GND
13	SCL	14	SDA
15	SB3V	16	SERIRQ
17	GND	18	GLKRUN#
19	LPCPD#	20	LDRQ#

Table 3-28: TPM Connector Pinouts

3.2.28 USB 2.0 Connectors

CN Label: **USB1, USB2**

CN Type: 8-pin header

CN Location: See **Figure 3-29**

CN Pinouts: See **Table 3-29**

The USB 2.0 connectors connect to USB 2.0 devices. Each pin header provides two USB 2.0 ports.

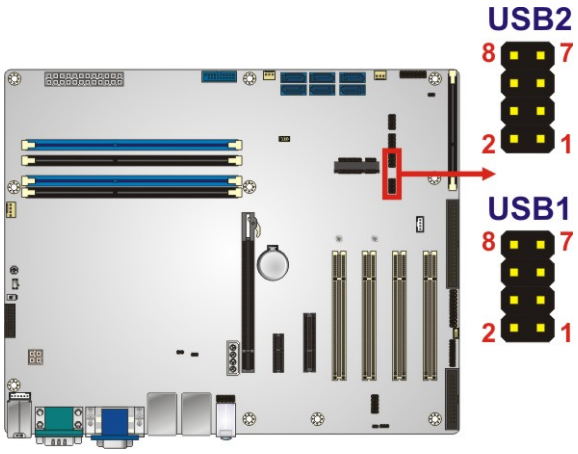


Figure 3-29: USB 2.0 Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	GND
3	USB_DATA-	4	USB_DATA+
5	USB_DATA+	6	USB_DATA-
7	GND	8	VCC

Table 3-29: USB 2.0 Connector Pinouts

3.2.29 USB 3.0 Connector

CN Label: **CN4**

CN Type: 19-pin box header

CN Location: See **Figure 3-30**

CN Pinouts: See **Table 3-30**

The USB 3.0 connector connects to USB 3.0 devices. This connector provides two USB 3.0 ports.

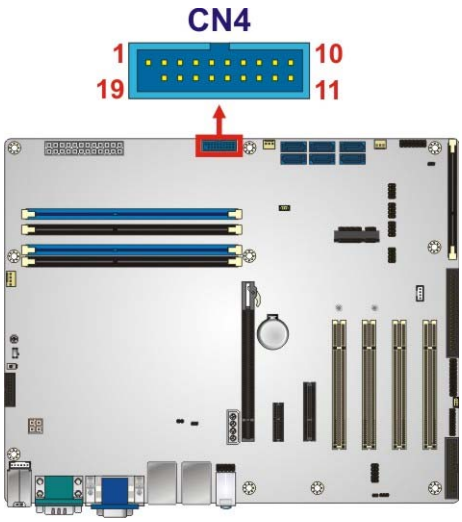


Figure 3-30: USB 3.0 Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	11	USB_DATA+
2	USB3_RX-	12	USB_DATA-
3	USB3_RX+	13	GND
4	GND	14	USB3_TX+
5	USB3_TX-	15	USB3_TX-
6	USB3_TX+	16	GND
7	GND	17	USB3_RX+
8	USB_DATA-	18	USB3_RX-
9	USB_DATA+	19	VCC
10	NC		

Table 3-30: USB 3.0 Connector Pinouts

3.3 External Peripheral Interface Connector Panel

The figure below shows the external peripheral interface connector (EPIC) panel. The EPIC panel consists of the following:

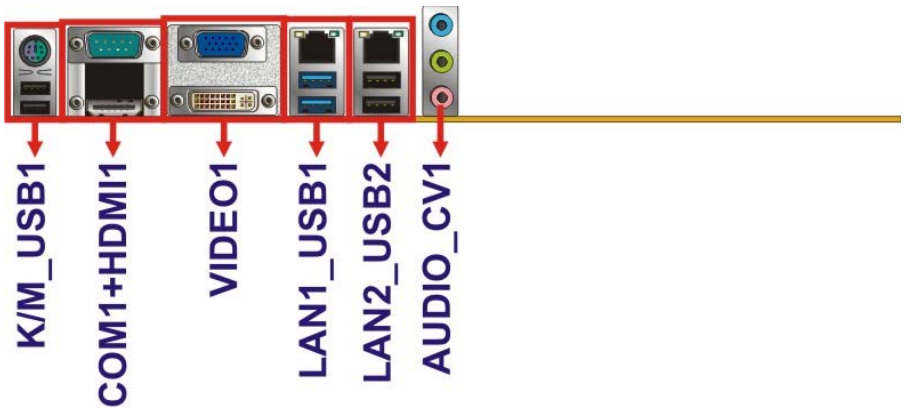


Figure 3-31: External Peripheral Interface Connector

3.3.1 Audio Connector

CN Label: **AUDIO_CV1**

CN Type: Audio jack

CN Location: See **Figure 3-31**

The audio jacks connect to external audio devices.

- **Line In port (Light Blue):** Connects a CD-ROM, DVD player, or other audio devices.
- **Line Out port (Lime):** Connects to a headphone or a speaker. With multi-channel configurations, this port can also connect to front speakers.
- **Microphone (Pink):** Connects a microphone.

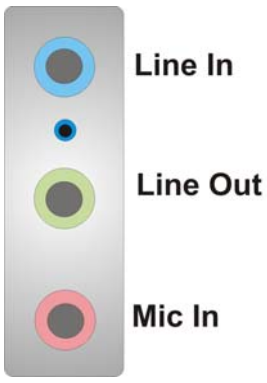


Figure 3-32: Audio Connector

3.3.2 Keyboard/Mouse and USB 2.0 Connectors

CN Label: **K/M_USB1**

CN Type: PS/2, USB 2.0

CN Location: See **Figure 3-31**

CN Pinouts: See **Table 3-31** and **Table 3-32**

The USB 2.0 connector can be connected to a USB device.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	VCC	5	VCC
2	USB_DATA-	6	USB_DATA-
3	USB_DATA+	7	USB_DATA+
4	GND	8	GND

Table 3-31: USB 2.0 Port Pinouts

The PS/2 port is for connecting a PS/2 mouse and a PS/2 keyboard.

PIN	DESCRIPTION
9	GND
10	Keyboard Data
11	Mouse Data
12	VCC
13	Keyboard Clock
14	Mouse Clock

Table 3-32: PS/2 Connector Pinouts

3.3.3 Ethernet and USB 2.0 Connectors

CN Label: **LAN2_USB2**

CN Type: RJ-45, USB 3.0

CN Location: See **Figure 3-31**

CN Pinouts: See **Table 3-33** and **Table 3-34**

The USB 2.0 connector can be connected to a USB device.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	VCC	5	VCC
2	USB_DATA-	6	USB_DATA-
3	USB_DATA+	7	USB_DATA+
4	GND	8	GND

Table 3-33: USB 2.0 Port Pinouts

A 10/100/1000 Mb/s connection can be made to a Local Area Network.

PIN	DESCRIPTION	PIN	DESCRIPTION
P2	TRD2P0	P6	TRD2P2
P3	TRD2N0	P7	TRD2N2
P4	TRD2P1	P8	TRD2P3
P5	TRD2N1	P9	TRD2N3

Table 3-34: LAN2 Pinouts

3.3.4 Ethernet and USB 3.0 Connectors

CN Label: **LAN1_USB1**

CN Type: RJ-45, USB 3.0

CN Location: See **Figure 3-31**

CN Pinouts: See **Table 3-35** and **Table 3-36**

There are two external USB 3.0 connectors on the IMBA-Q870-i2.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	VCC	10	VCC
2	USB_DATA-	11	USB_DATA-
3	USB_DATA+	12	USB_ DATA+
4	GND	13	GND
5	USB3_RX-	14	USB3_RX-
6	USB3_RX+	15	USB3_ RX+

PIN	DESCRIPTION	PIN	DESCRIPTION
7	GND	16	GND
8	USB3_TX-	17	USB3_TX-
9	USB3_TX+	18	USB3_TX+

Table 3-35: USB 3.0 Port Pinouts

A 10/100/1000 Mb/s connection can be made to a Local Area Network. LAN1 also supports Intel® AMT 9.0.

PIN	DESCRIPTION	PIN	DESCRIPTION
20	LAN1_MDI0P	24	LAN1_MDI2P
21	LAN1_MDI0N	25	LAN1_MDI2N
22	LAN1_MDI1P	26	LAN1_MDI3P
23	LAN1_MDI1N	27	LAN1_MDI3N

Table 3-36: LAN1 Pinouts

3.3.5 HDMI Port Connector

CN Label: **HDMI1**

CN Type: HDMI connector

CN Location: See **Figure 3-31**

CN Pinouts: See **Table 3-37**

The HDMI port connects to an HDMI device.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	HDMI_DATA2	13	N/C
2	GND	14	N/C
3	HDMI_DATA2#	15	HDMI_SCL
4	HDMI_DATA1	16	HDMI_SDA
5	GND	17	GND
6	HDMI_DATA1#	18	+5V
7	HDMI_DATA0	19	HDMI_HPD
8	GND	20	HDMI_GND

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
9	HDMI_DATA0#	21	HDMI_GND
10	HDMI_CLK	22	HDMI_GND
11	GND	23	HDMI_GND
12	HDMI_CLK#		

Table 3-37: HDMI Connector Pinouts

3.3.6 Serial Port Connector (COM1)

CN Label: **COM1**

CN Type: DB-9 connector

CN Location: See **Figure 3-31**

CN Pinouts: See **Table 3-38**

The serial port connects to a RS-232 serial communications device.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD1	6	DSR1
2	RXD1	7	RTS1
3	TXD1	8	CTS1
4	DTR1	9	RI1
5	GND		

Table 3-38: Serial Port Connector Pinouts

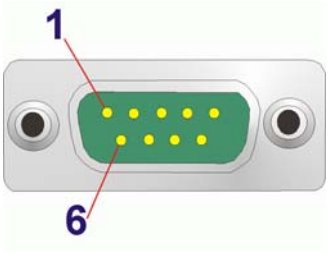


Figure 3-33: Serial Port Connector Pinouts

3.3.7 VGA and DVI Connectors

CN Label: **VIDEO1**

CN Type: 15-pin Female, 24-pin header

CN Location: See **Figure 3-31**

CN Pinouts: See **Table 3-39** and **Table 3-40**

The VGA connector connects to a monitor that accepts a standard VGA input.

PIN	DESCRIPTION	PIN	DESCRIPTION
V1	RED	V2	GREEN
V3	BLUE	V4	NC
V5	GND	V6	GND
V7	GND	V8	GND
V9	VCC	V10	GND
V11	NC	V12	DDCDA
V13	HSYNC	V14	VSYNC
V15	DDCCLK		

Table 3-39: VGA Connector Pinouts

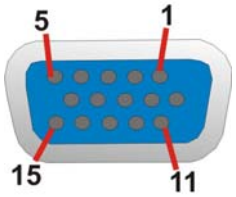


Figure 3-34: VGA Connector

The DVI connector connects to a monitor that supports DVI video input.

PIN	DESCRIPTION	PIN	DESCRIPTION
C1	RED	10	DVI_DATA1
C2	GREEN	11	GND
C3	BLUE	12	N/C
C4	HS	13	N/C
C5	GND	14	+5V
C6	NC	15	Hot Plug Detect
1	DVI_DATA2#	16	HPDET

PIN	DESCRIPTION	PIN	DESCRIPTION
2	DVI_DATA2	17	DVI_DATA0#
3	GND	18	DVI_DATA0
4	N/C	19	GND
5	N/C	20	N/C
6	DDC CLK	21	N/C
7	DDC DATA	22	N/C
8	VS	23	DVI_CLK
9	DVI_DATA1#	24	DVI_CLK#

Table 3-40: DVI Connector Pinouts

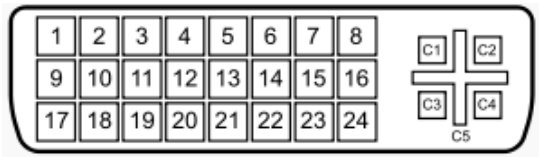


Figure 3-35: DVI-I Connector

Chapter

4

Installation

4.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the IMBA-Q870-i2 may result in permanent damage to the IMBA-Q870-i2 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the IMBA-Q870-i2. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the IMBA-Q870-i2 or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband***: - Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding***:- Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad***: When configuring the IMBA-Q870-i2, place it on an antic-static pad. This reduces the possibility of ESD damaging the IMBA-Q870-i2.
- ***Only handle the edges of the PCB***:-: When handling the PCB, hold the PCB by the edges.

4.2 Installation Considerations

NOTE:

The following installation notices and installation considerations should be read and understood before installation. All installation notices must be strictly adhered to. Failing to adhere to these precautions may lead to severe damage and injury to the person performing the installation.

WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the components and injury to the user.

Before and during the installation please **DO** the following:

- Read the user manual:
  - The user manual provides a complete description of the IMBA-Q870-i2 installation instructions and configuration options.
- Wear an electrostatic discharge cuff (ESD):
  - Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- Place the IMBA-Q870-i2 on an antistatic pad:
  - When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- Turn all power to the IMBA-Q870-i2 off:
  - When working with the IMBA-Q870-i2, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the IMBA-Q870-i2 **DO NOT:**

- Remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- Use the product before verifying all the cables and power connectors are properly connected.
- Allow screws to come in contact with the PCB circuit, connector pins, or its components.

4.2.1 Socket LGA1150 CPU Installation

WARNING:

CPUs are expensive and sensitive components. When installing the CPU please be careful not to damage it in anyway. Make sure the CPU is installed properly and ensure the correct cooling kit is properly installed.

DO NOT touch the pins at the bottom of the CPU. When handling the CPU, only hold it on the sides.

To install the CPU, follow the steps below.

Step 1: **Disengage the load lever** by pressing the lever down and slightly outward to clear the retention tab. Fully open the lever. See **Figure 4-1**.

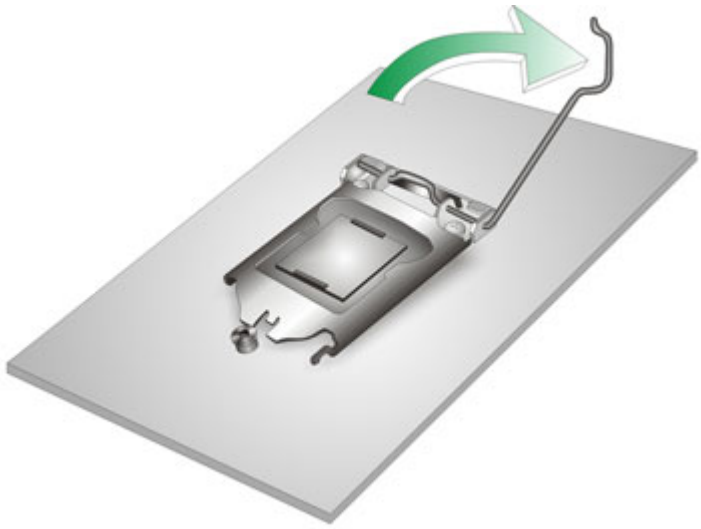


Figure 4-1: Disengage the CPU Socket Load Lever

Step 2: **Open the socket and remove the protective cover.** The black protective cover can be removed by pulling up on the tab labeled "Remove". See **Figure 4-2**.

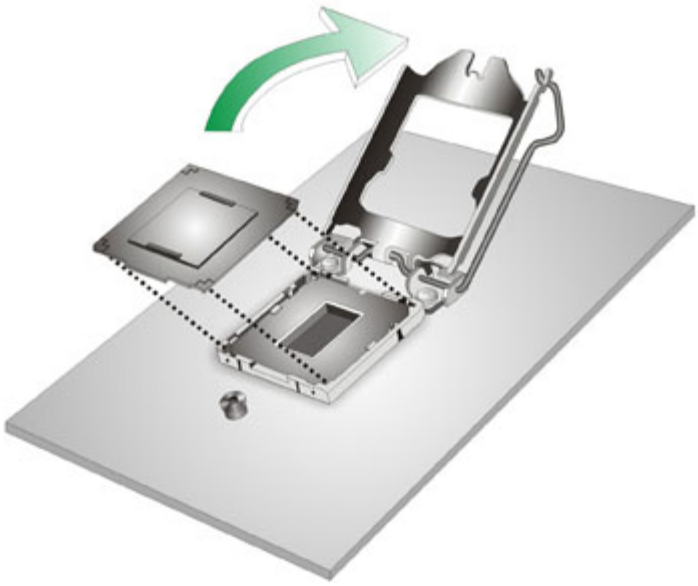


Figure 4-2: Remove Protective Cover

Step 3: **Inspect the CPU socket.** Make sure there are no bent pins and make sure the socket contacts are free of foreign material. If any debris is found, remove it with compressed air.

Step 4: **Orientate the CPU properly.** The contact array should be facing the CPU socket.

WARNING:

DO NOT touch the pins at the bottom of the CPU. When handling the CPU, only hold it on the sides.

Step 5: **Correctly position the CPU.** Match the Pin 1 mark with the cut edge on the CPU socket.

Step 6: **Align the CPU pins.** Locate pin 1 and the two orientation notches on the CPU. Carefully match the two orientation notches on the CPU with the socket alignment keys.

Step 7: **Insert the CPU.** Gently insert the CPU into the socket. If the CPU pins are properly aligned, the CPU should slide into the CPU socket smoothly. See **Figure 4-3**.

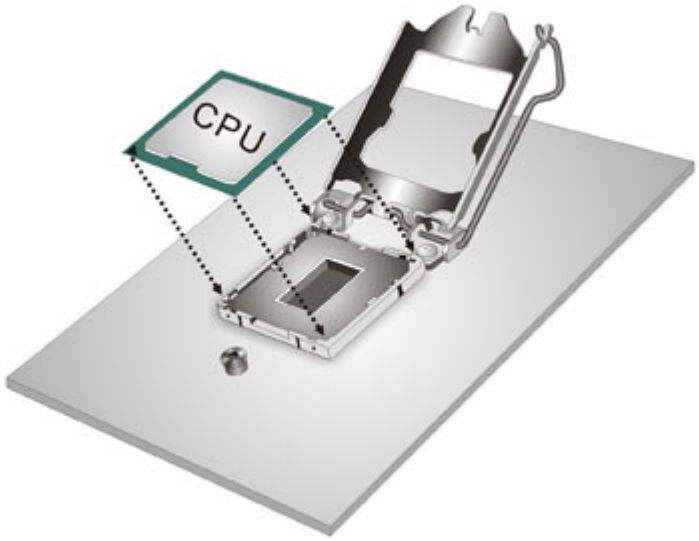


Figure 4-3: Insert the Socket LGA1150 CPU

Step 8: **Close the CPU socket.** Close the load plate and pull the load lever back a little to have the load plate be able to secure to the knob. Engage the load lever by pushing it back to its original position (**Figure 4-4**). There will be some resistance, but will not require extreme pressure.

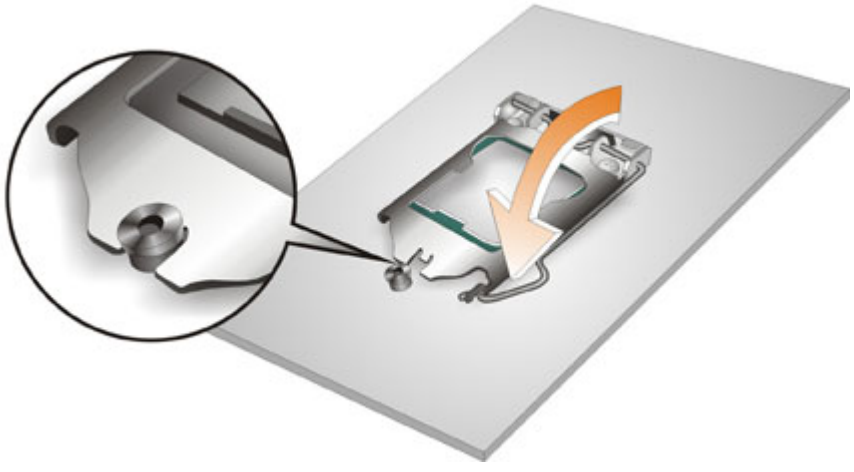


Figure 4-4: Close the Socket LGA1150

Step 9: **Connect the 12 V power to the board.** Connect the 12 V power from the power supply to the board.

4.2.2 Socket LGA1150 Cooling Kit Installation

WARNING:

DO NOT attempt to install a push-pin cooling fan.

The pre-installed support bracket prevents the board from bending and is ONLY compatible with captive screw type cooling fans.

Figure 4-5: Cooling Kits (CF-1156A-RS and CF-1156E-RS)

The cooling kit can be bought from IEI. The cooling kit has a heatsink and fan.

WARNING:

Do not wipe off (accidentally or otherwise) the pre-sprayed layer of thermal paste on the bottom of the heat sink. The thermal paste between the CPU and the heat sink is important for optimum heat dissipation.

To install the cooling kit, follow the instructions below.

Step 1: A cooling kit bracket is pre-installed on the rear of the motherboard. See **Figure 4-6**.

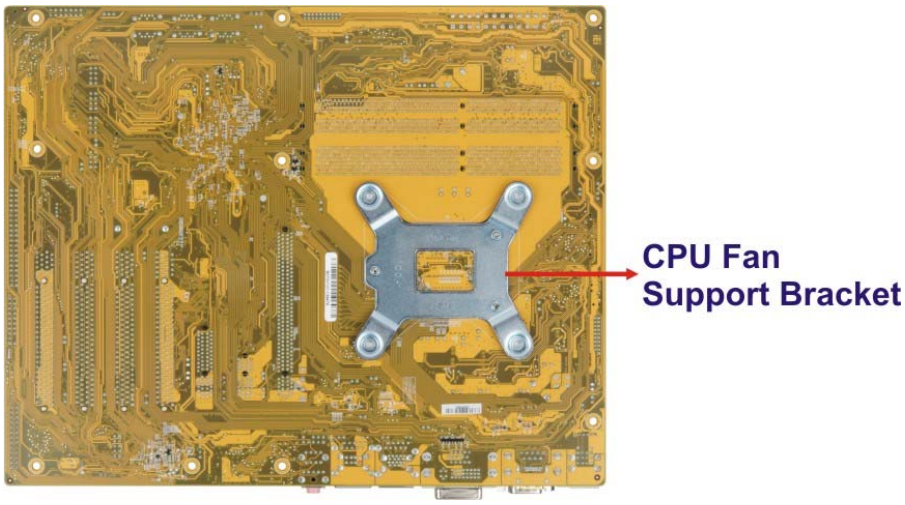


Figure 4-6: Cooling Kit Support Bracket

Step 2: **Place the cooling kit onto the socket LGA1150 CPU**. Make sure the CPU cable can be properly routed when the cooling kit is installed.

Step 3: **Mount the cooling kit**. Gently place the cooling kit on top of the CPU. Make sure the four threaded screws on the corners of the cooling kit properly pass through the holes of the cooling kit bracket.

Step 4: **Secure the cooling kit** by fastening the four retention screws of the cooling kit.

Step 5: **Connect the fan cable**. Connect the cooling kit fan cable to the fan connector on the IMBA-Q870-i2. Carefully route the cable and avoid heat generating chips and fan blades.

4.2.3 DIMM Installation

To install a DIMM, please follow the steps below and refer to **Figure 4-7**.

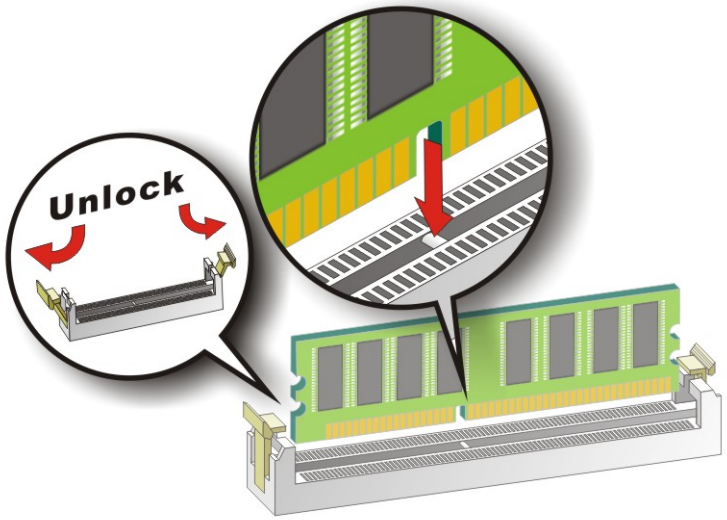


Figure 4-7: DIMM Installation

Step 1: **Open the DIMM socket handles**. Open the two handles outwards as far as they can. See **Figure 4-7**.

Step 2: **Align the DIMM with the socket**. Align the DIMM so the notch on the memory lines up with the notch on the memory socket. See **Figure 4-7**.

Step 3: **Insert the DIMM**. Once aligned, press down until the DIMM is properly seated. Clip the two handles into place. See **Figure 4-7**.

Step 4: **Removing a DIMM**. To remove a DIMM, push both handles outward. The memory module is ejected by a mechanism in the socket.

4.2.4 iRIS-2400 Module Installation

WARNING:

The iRIS module slot is designed to install the IEI iRIS-2400 IPMI 2.0 module only. DO NOT install other modules into the iRIS module slot. Doing so may cause damage to the IMBA-Q870-i2.

To install the iRIS-2400 module, please follow the steps below and refer to Figure 4-7.

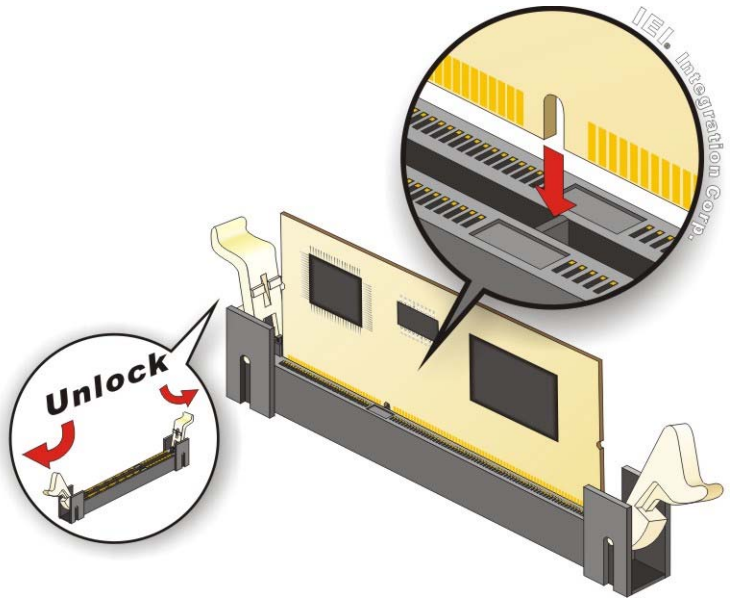


Figure 4-8: iRIS-2400 Module Installation

Step 1: **Open the socket handles**. Open the two handles outwards as far as they can. See Figure 4-7.

Step 2: **Align the iRIS-2400 module with the socket**. Align the iRIS-2400 module so the notch on the module lines up with the notch on the socket. See Figure 4-7.

Step 3: **Insert the iRIS-2400 module**. Once aligned, press down until the iRIS-2400 module is properly seated. Clip the two handles into place. See Figure 4-7.

Step 4: **Removing the iRIS-2400 module**. To remove the iRIS-2400 module, push both handles outward. The module is ejected by a mechanism in the socket.

NOTE:

After installing the iRIS-2400 module, use **LAN2** port to establish a network connection. Please refer to **Section 4.7** for IPMI setup procedures.

4.2.5 mSATA Card Installation

To install a mSATA card, please follow the steps below.

Step 1: **Locate the mSATA card slot**. The location of the mSATA card slot is shown in **Chapter 3**.

Step 2: **Remove the retention screws**. Remove the two retention screws secured on the motherboard as shown in **Figure 4-9**.

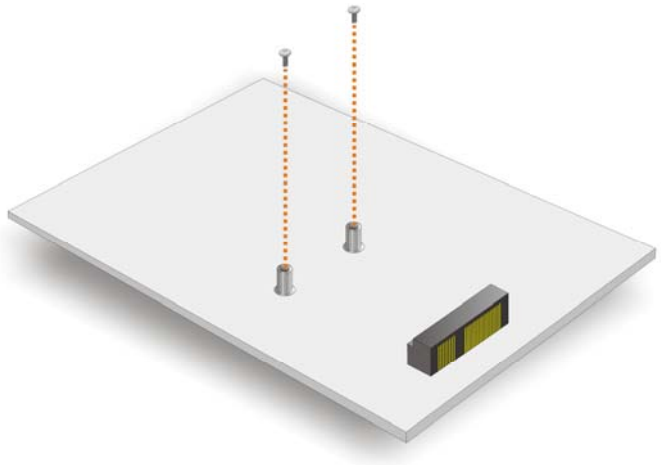


Figure 4-9: Remove the Retention Screws for the mSATA Card

Step 3: **Insert into the socket at an angle**. Line up the notch on the card with the notch on the connector. Slide the mSATA card into the socket at an angle of about 20º (**Figure 4-10**).

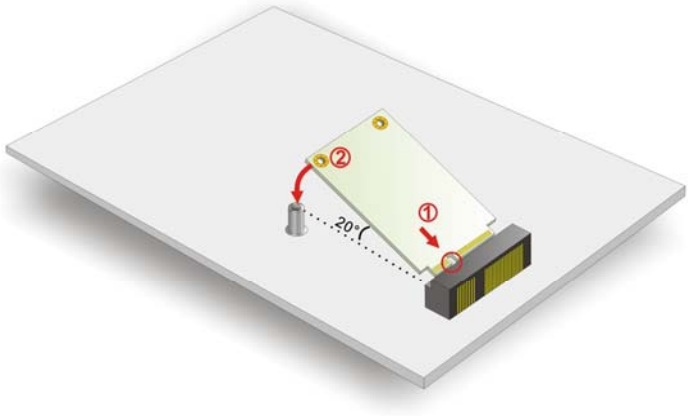


Figure 4-10: Insert the mSATA Card into the Socket at an Angle

Step 4: **Secure the mSATA card**. Secure the mSATA card with the retention screws previously removed (**Figure 4-11**).

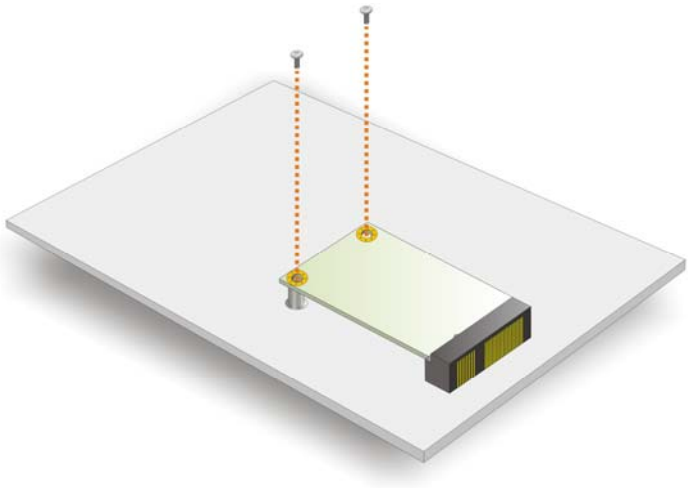


Figure 4-11: Secure the mSATA Card

4.3 System Configuration

The system configuration is controlled by buttons, switches, jumpers and BIOS options. The system configuration must be performed before installation.

4.3.1 AT/ATX Power Mode Setting

The AT and ATX power mode selection is made through the AT/ATX power mode switch which is shown in **Figure 4-12**.

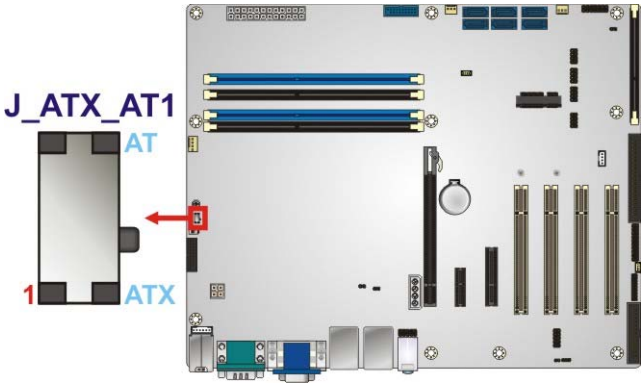


Figure 4-12: AT/ATX Power Mode Switch Location

4.3.2 Clear CMOS Button

To reset the BIOS, remove the on-board battery and press the clear CMOS button for three seconds or more. The clear CMOS button location is shown in **Figure 4-13**.

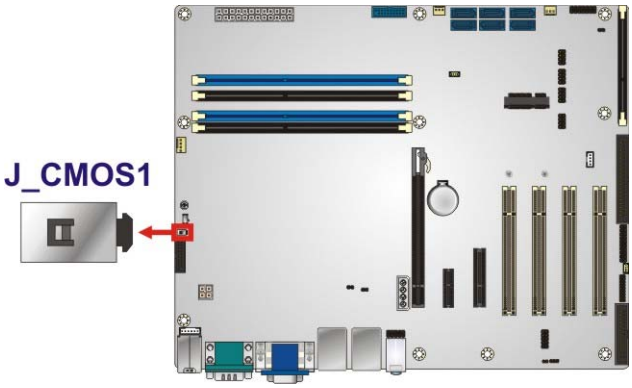


Figure 4-13: Clear CMOS Button Location

4.3.3 Flash Descriptor Security Override

The Flash Descriptor Security Override jumper specifies whether to override the flash descriptor.

Setting	Description
Short 1-2	No override (Default)
Short 2-3	Override

Table 4-1: Flash Descriptor Security Override Jumper Settings

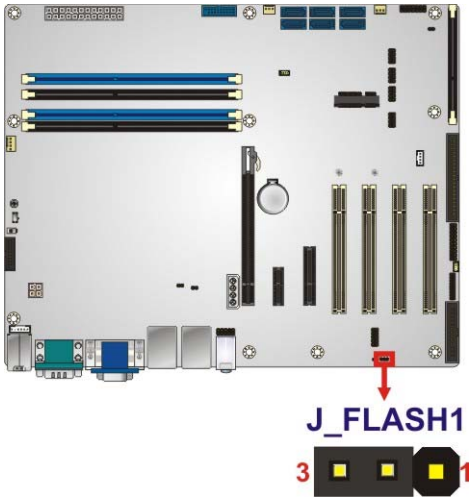


Figure 4-14: Flash Descriptor Security Override Jumper Location

4.3.4 mSATA Slot Setup

The mSATA Slot Setup jumper specifies whether to automatically detect the mSATA device installed in the mSATA card slot (CN2). If the user shorts the mSATA Slot Setup jumper to force the system to enable mSATA device, the S_ATA6 connector will be disabled.

Setting	Description
Open	Automatically detect mSATA device (Default)
Short	Force to enable mSATA device (The S_ATA6 connector will be disabled)

Table 4-2: mSATA Slot Setup Jumper Settings

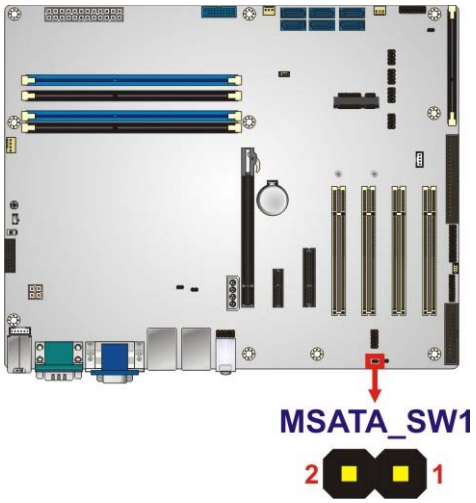


Figure 4-15: mSATA Slot Setup Jumper Location

4.3.5 PCIe x16 Interface Setup

The PCIe x16 interface setup is made through the BIOS options in "Chipset → PCH-IO Configuration" BIOS menu. Use the **PCIEX16 Power** option to configure the PCIe x16 channel mode.

BIOS Options	Description
1 x16 PCIE	Sets the PCIe x16 slot as one PCIe x16. (Default)

Table 4-3: PCIe x16 Interface Setup

Please refer to **Section 5.4.1** for detailed information.

4.3.6 USB Power Select

The USB power selection is made through the BIOS options in "Chipset → PCH-IO Configuration" BIOS menu. Use the **USB SW1 Power** and the **USB SW2 Power** BIOS options to configure the power source to the corresponding USB ports (see **Table 4-4**).

BIOS Options	Configured USB Ports
USB SW1 Power	K/M_USB1 (external USB 2.0 ports) LAN1_USB1 (external USB 3.0 ports)

BIOS Options	Configured USB Ports
USB SW2 Power	LAN2_USB2 (external USB 2.0 ports) USB1 (internal USB 2.0 ports) USB2 (internal USB 2.0 ports) CN4 (internal USB 3.0 ports)

Table 4-4: BIOS Options and Configured USB Ports

Please refer to **Section 5.4.1** for detailed information.

4.4 Internal Peripheral Device Connections

This section outlines the installation of peripheral devices to the onboard connectors.

4.4.1 SATA Drive Connection

The IMBA-Q870-i2 is shipped with two SATA drive cables. To connect the SATA drives to the connectors, please follow the steps below.

Step 1: **Locate the connectors**. The locations of the SATA drive connectors are shown in **Chapter 3**.

Step 2: **Insert the cable connector**. Insert the cable connector into the on-board SATA drive connector. See **Figure 4-16**.

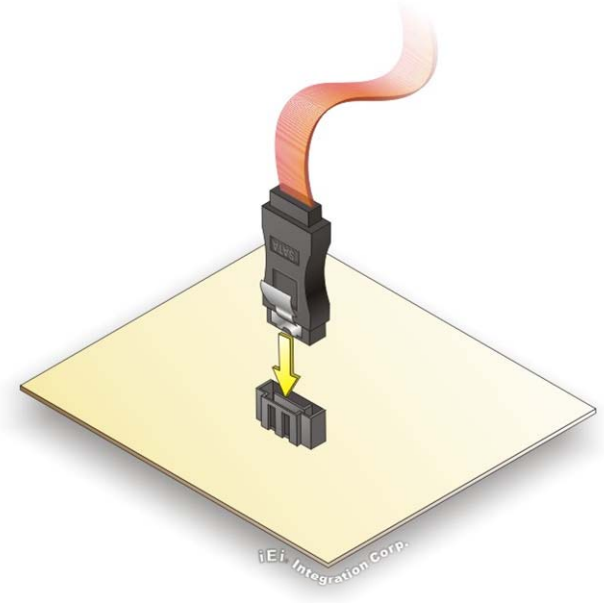


Figure 4-16: SATA Drive Cable Connection

Step 3: **Connect the cable to the SATA disk**. Connect the connector on the other end of the cable to the connector at the back of the SATA drive. See **Figure 4-17**.

Step 4: **Connect the SATA power cable (optional)**. Connect the SATA power connector to the back of the SATA drive. See **Figure 4-17**.

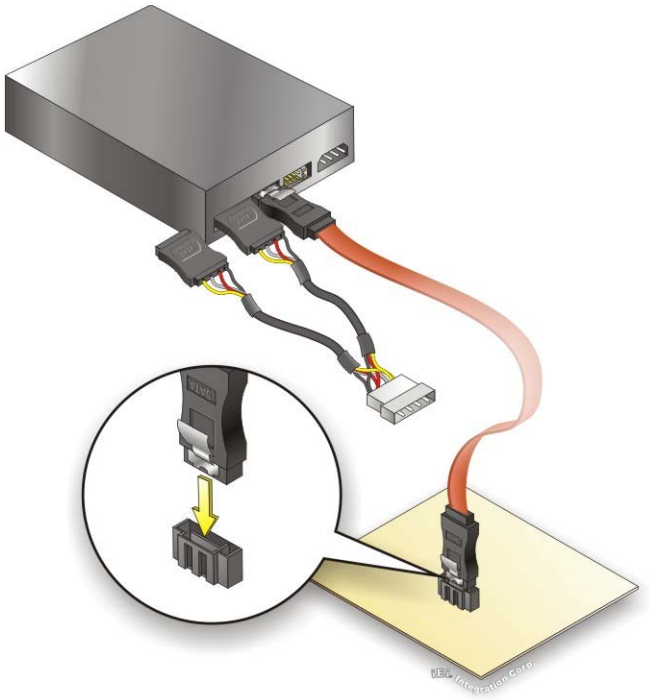


Figure 4-17: SATA Power Drive Connection

The SATA power cable can be bought from IEI. See Optional Items in Section 2.4.

4.5 External Peripheral Interface Connection

This section describes connecting devices to the external connectors on the IMBA-Q870-i2.

4.5.1 Audio Connector

The audio jacks on the external audio connector enable the IMBA-Q870-i2 to be connected to a stereo sound setup. Each jack supports both input and output. When connecting a device, the High Definition Audio utility will automatically detect input or output. The lime green (top) audio jack does not support input from a microphone. To install the audio devices, follow the steps below.

Step 1: **Identify the audio plugs**. The plugs on your home theater system or speakers may not match the colors on the rear panel.

Step 2: **Plug the audio plugs into the audio jacks**. Plug the audio plugs into the audio jacks. If the plugs on your speakers are different, an adapter will need to be used to plug them into the audio jacks.

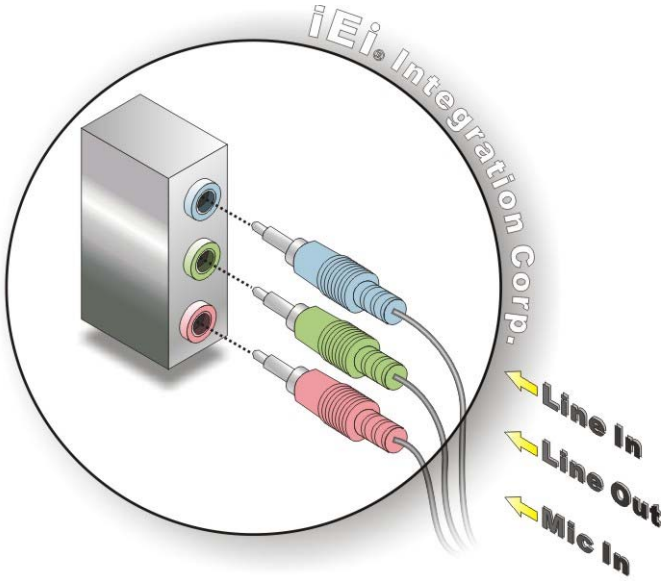


Figure 4-18: Audio Connector

Step 3: **Check audio clarity**. Check that the sound is coming through the right speakers by adjusting the balance front to rear and left to right.

4.5.2 DVI Display Device Connection

The IMBA-Q870-i2 has a single female DVI-I connector on the external peripheral interface panel. The DVI-I connector is connected to a digital display device. To connect a digital display device to the IMBA-Q870-i2, please follow the instructions below.

Step 1: **Locate the DVI-I connector**. The location of the DVI-I connector is shown in another chapter.

Step 2: **Align the DVI-I connector**. Align the male DVI-I connector on the digital display device cable with the female DVI-I connector on the external peripheral interface.

Step 3: **Insert the DVI-I connector** Once the connectors are properly aligned with the male connector, insert the male connector from the digital display device into the female connector on the IMBA-Q870-i2. See Figure 4-19.

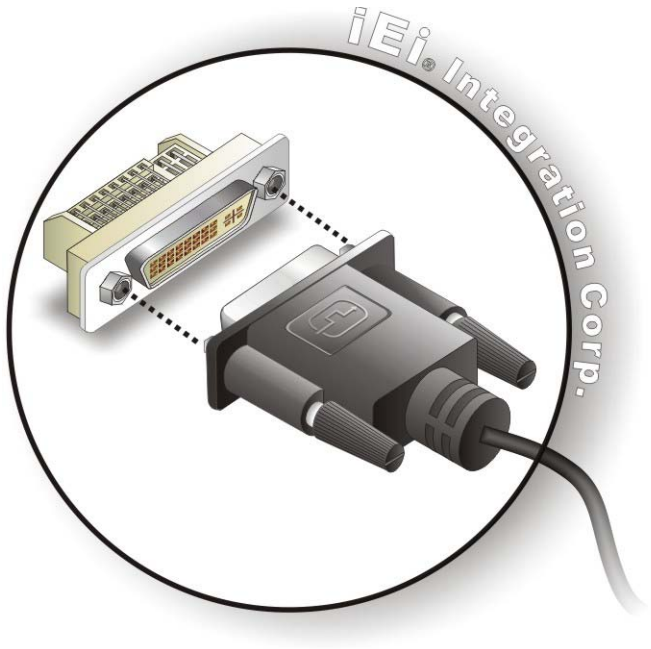


Figure 4-19: DVI Connector

Step 4: **Secure the connector.** Secure the DVI-I connector from the digital display device to the external interface by tightening the two retention screws on either side of the connector.

4.5.3 HDMI Display Device Connection

The HDMI connector transmits a digital signal to compatible HDMI display devices such as a TV or computer screen. To connect the HDMI cable to the IMBA-Q870-i2, follow the steps below.

Step 1: **Locate the HDMI connector**. The location is shown in **Chapter 3**.

Step 2: **Align the connector.** Align the HDMI connector with the HDMI port. Make sure the orientation of the connector is correct.

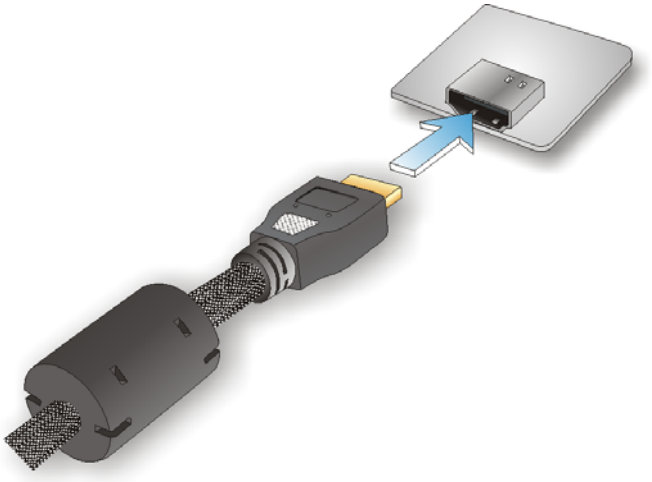


Figure 4-20: HDMI Connection

Step 3: **Insert the HDMI connector.** Gently insert the HDMI connector. The connector should engage with a gentle push. If the connector does not insert easily, check again that the connector is aligned correctly, and that the connector is being inserted with the right way up.

4.5.4 LAN Connection

There are two external RJ-45 LAN connectors. The RJ-45 connectors enable connection to an external network. To connect a LAN cable with an RJ-45 connector, please follow the instructions below.

Step 1: **Locate the RJ-45 connectors**. The locations of the USB connectors are shown in **Chapter 3**.

Step 2: **Align the connectors.** Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the IMBA-Q870-i2. See **Figure 4-21**.

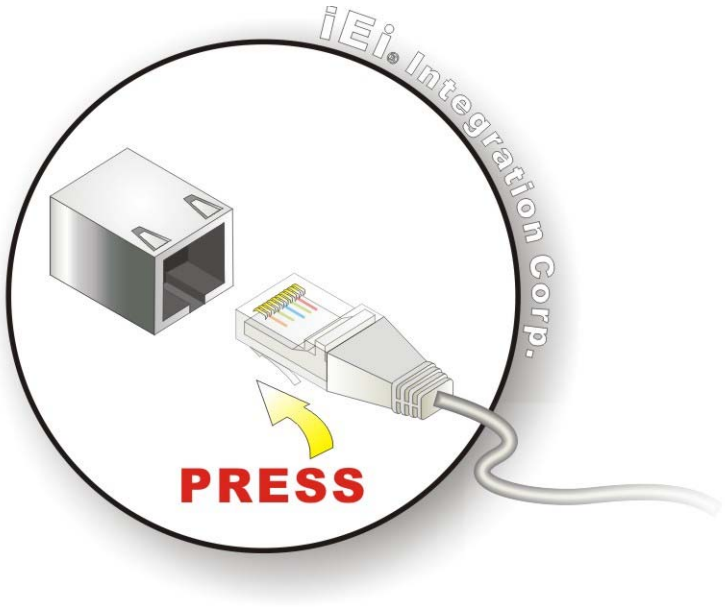


Figure 4-21: LAN Connection

Step 3: **Insert the LAN cable RJ-45 connector.** Once aligned, gently insert the LAN cable RJ-45 connector into the on-board RJ-45 connector.

4.5.5 PS/2 Keyboard and Mouse Connection

The IMBA-Q870-i2 has a PS/2 connector on the external peripheral interface panel. The PS/2 connector is used to connect to a keyboard or a mouse to the system. Follow the steps below to connect a keyboard or a mouse to the IMBA-Q870-i2.

Step 1: **Locate the PS/2 connector**. The location of the PS/2 connector is shown in **Chapter 3**.

Step 2: **Insert the keyboard/mouse connector**. Insert a PS/2 keyboard or mouse connector into the appropriate PS/2 connector on the external peripheral interface connector. See **Figure 4-22**.

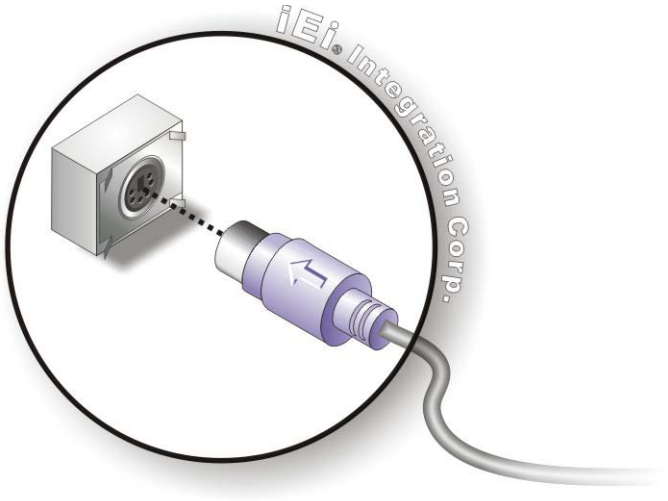


Figure 4-22: PS/2 Keyboard/Mouse Connector

4.5.6 Serial Device Connection

The IMBA-Q870-i2 has a single male DB-9 connector on the external peripheral interface panel for a serial device. Follow the steps below to connect a serial device to the IMBA-Q870-i2.

Step 1: **Locate the DB-9 connector**. The location of the DB-9 connector is shown in **Chapter 3**.

Step 2: **Insert the serial connector**. Insert the DB-9 connector of a serial device into the DB-9 connector on the external peripheral interface. See **Figure 4-23**.

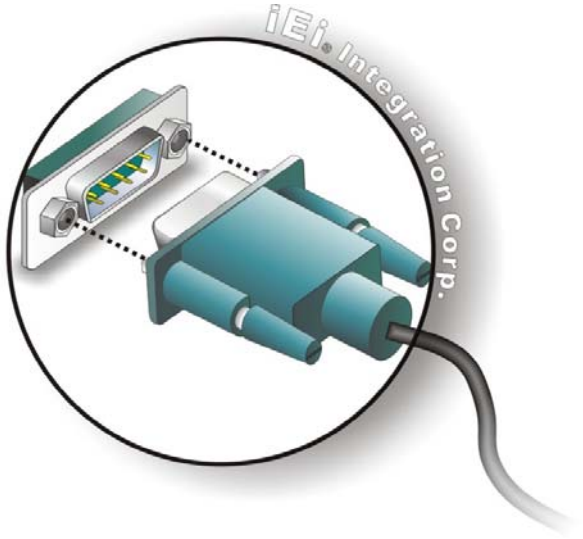


Figure 4-23: Serial Device Connector

Step 3: **Secure the connector**. Secure the serial device connector to the external interface by tightening the two retention screws on either side of the connector.

4.5.7 USB Connection (Dual Connector)

The external USB Series "A" receptacle connectors provide easier and quicker access to external USB devices. Follow the steps below to connect USB devices to the IMBA-Q870-i2.

Step 1: **Locate the USB Series "A" receptacle connectors**. The location of the USB Series "A" receptacle connectors are shown in **Chapter 3**.

Step 2: **Insert a USB Series "A" plug**. Insert the USB Series "A" plug of a device into the USB Series "A" receptacle on the external peripheral interface. See **Figure 4-24**.

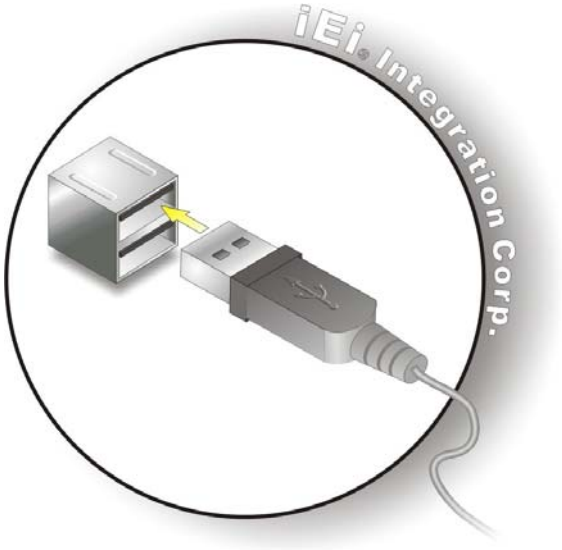


Figure 4-24: USB Connector

4.5.8 VGA Monitor Connection

The IMBA-Q870-i2 has a single female DB-15 connector on the external peripheral interface panel. The DB-15 connector is connected to a CRT or VGA monitor. To connect a monitor to the IMBA-Q870-i2, please follow the instructions below.

Step 1: **Locate the female DB-15 connector**. The location of the female DB-15 connector is shown in **Chapter 3**.

Step 2: **Align the VGA connector**. Align the male DB-15 connector on the VGA screen cable with the female DB-15 connector on the external peripheral interface.

Step 3: **Insert the VGA connector** Once the connectors are properly aligned with the insert the male connector from the VGA screen into the female connector on the IMBA-Q870-i2. See **Figure 4-25**.

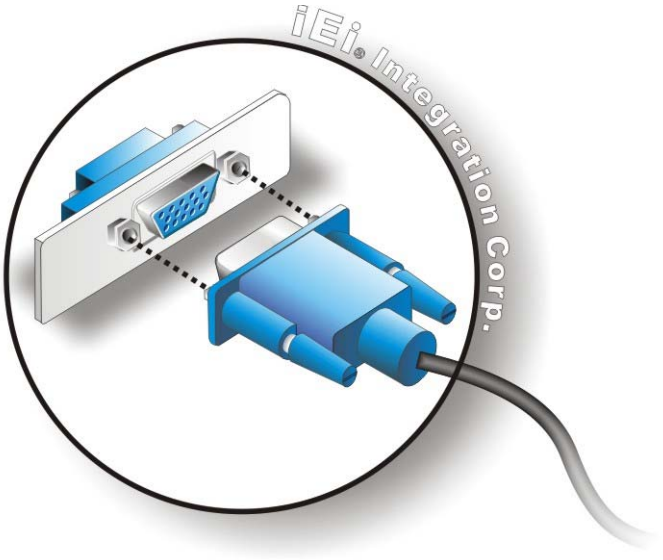


Figure 4-25: VGA Connector

Step 4: **Secure the connector**. Secure the DB-15 VGA connector from the VGA monitor to the external interface by tightening the two retention screws on either side of the connector.

4.6 Intel® AMT Setup Procedure

The IMBA-Q870-i2 is featured with the Intel® Active Management Technology (AMT). To enable the Intel® AMT function, follow the steps below.

Step 1: Make sure at least one of the memory sockets is installed with a DDR3 DIMM.

Step 2: Connect an Ethernet cable to the RJ-45 connector labeled **LAN1**.

Step 3: The AMI BIOS options regarding the Intel® ME or Intel® AMT must be enabled,

Step 4: Properly install the Intel® Management Engine Components drivers from the iAMT Driver & Utility directory in the driver CD. See **Section 6.8**.

Step 5: Configure the Intel® Management Engine BIOS extension (MEBx). To get into the Intel® MEBx settings, press <Ctrl+P> after a single beep during boot-up

process. Enter the Intel® current ME password as it requires (the Intel® default password is **admin**).

NOTE:

To change the password, enter a new password following the strong password rule (containing at least one upper case letter, one lower case letter, one digit and one special character, and be at least eight characters).

4.7 IPMI Setup Procedure

The IMBA-Q870-i2 features Intelligent Platform Management Interface (IPMI) that helps lower the overall costs of server management by enabling users to maximize IT resources, save time and manage multiple systems. The IMBA-Q870-i2 supports IPMI 2.0 through the optional iRIS-2400 module. Follow the steps below to setup IPMI.

4.7.1 Managed System Hardware Setup

The hardware configuration of the managed system (IMBA-Q870-i2) is described below.

Step 1: Install an iRIS-2400 module to the IPMI module socket (refer to **Section 4.2.4**).

Step 2: Make sure at least one DDR3 DIMM is installed in one of the DIMM sockets. If multiple DIMMs are installed, all of the DIMMs must be same size, same speed and same brand to get the best performance.

Step 3: Connect an Ethernet cable to the RJ-45 connector labeled **LAN2_USB2** (**Figure 3-31**).

4.7.2 Using the IEI iMAN Web GUI

To manage a client system from a remote console using IEI iMAN Web GUI, follow the steps below.

Step 1: Obtain the IP address of the managed system. It is recommended to use the IPMI Tool on the managed system to obtain the IP address. To use IPMI Tool to obtain IP address, follow the steps below:

a. Copy the **Ipmitool.exe** file to a bootable USB flash drive.

b. Insert the USB flash drive to the IMBA-Q870-i2

c. The IMBA-Q870-i2 boots from the USB flash drive

d. Enter the following command: **ipmitool 20 30 02 01 03 00 00**

(there is a space between each two-digit number)

e. A serial of number shows. The last four two-digit hexadecimal numbers are the IP address. Convert the hexadecimal numbers to decimal numbers.

Step 2: On the remote management console, open a web browser. Enter the managed system IP address in the web browser (**Figure 4-26**).

Figure 4-26: IEI iMAN Web Address

Step 3: The login page appears in the web browser.

Step 4: Enter the user name and password to login the system. The default login username and password are:

-Username: **admin**

-Password: **admin**

Step 5: Press the login button to login the system.

Step 6: The IEI iMAN Web GUI appears (**Figure 4-27**).

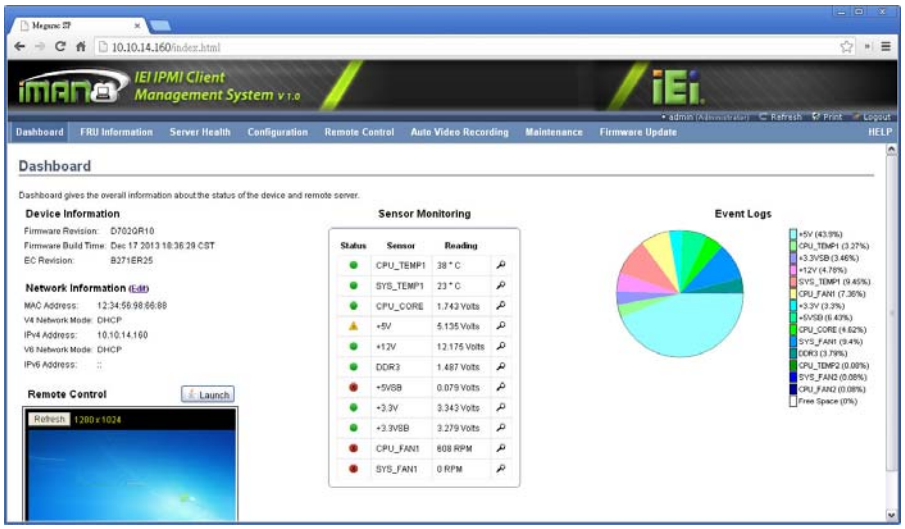


Figure 4-27: IEI iMAN Web GUI

NOTE:

To understand how to use the IEI iMAN Web GUI, please refer to the iRIS-2400 Web GUI user manual in the utility CD came with the IMBA-Q870-i2. The user manual describes each function in detail.

Chapter

5

BIOS

5.1 Introduction

The BIOS is programmed onto the BIOS chip. The BIOS setup program allows changes to certain system settings. This chapter outlines the options that can be changed.

NOTE:

Some of the BIOS options may vary throughout the life cycle of the product and are subject to change without prior notice.

5.1.1 Starting Setup

The UEFI BIOS is activated when the computer is turned on. The setup program can be activated in one of two ways.

1. Press the **DEL** or **F2** key as soon as the system is turned on or
2. Press the **DEL** or **F2** key when the "**Press DEL or F2 to enter SETUP**" message appears on the screen.

If the message disappears before the **DEL or F2** key is pressed, restart the computer and try again.

5.1.2 Using Setup

Use the arrow keys to highlight items, press **ENTER** to select, use the PageUp and PageDown keys to change entries, press **F1** for help and press **ESC** to quit. Navigation keys are shown in **Table 5-1**.

Key	Function
Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
+	Increase the numeric value or make changes

Key	Function
-	Decrease the numeric value or make changes
Esc key	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 key	Load previous values
F3 key	Load optimized defaults
F4 key	Save changes and Exit BIOS

Table 5-1: BIOS Navigation Keys

When **F1** is pressed a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press **Esc** or the **F1** key again.

5.1.4 Unable to Reboot after Configuration Changes

If the computer cannot boot after changes to the system configuration is made, CMOS defaults. Use the clear CMOS button described in **Chapter 4**.

5.1.5 BIOS Menu Bar

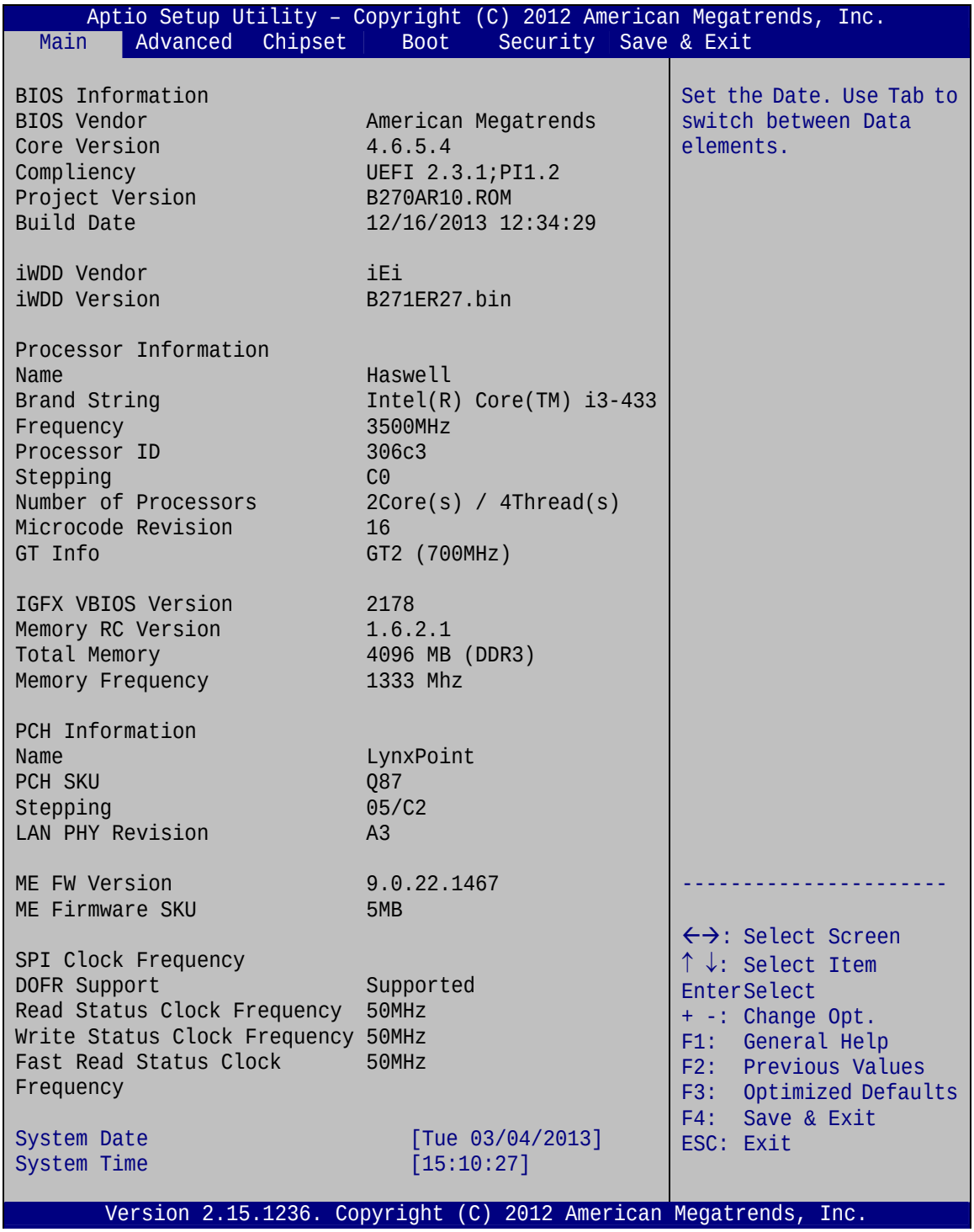
The **menu bar** on top of the BIOS screen has the following main items:

- Main – Changes the basic system configuration.
- Advanced – Changes the advanced system settings.
- Chipset – Changes the chipset settings.
- Boot – Changes the system boot configuration.
- Security – Sets User and Supervisor Passwords.
- Save & Exit – Selects exit options and loads default settings

The following sections completely describe the configuration options found in the menu items at the top of the BIOS screen and listed above.

5.2 Main

The **Main** BIOS menu (**BIOS Menu 1**) appears when the **BIOS Setup** program is entered. The **Main** menu gives an overview of the basic system information.



BIOS Menu 1: Main

The System Overview field has two user configurable fields:

➔ **System Date [xx/xx/xx]**

Use the **System Date** option to set the system date. Manually enter the day, month and year.

➔ **System Time [xx:xx:xx]**

Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

5.3 Advanced

Use the **Advanced** menu (**BIOS Menu 2**) to configure the CPU and peripheral devices through the following sub-menus:

WARNING!

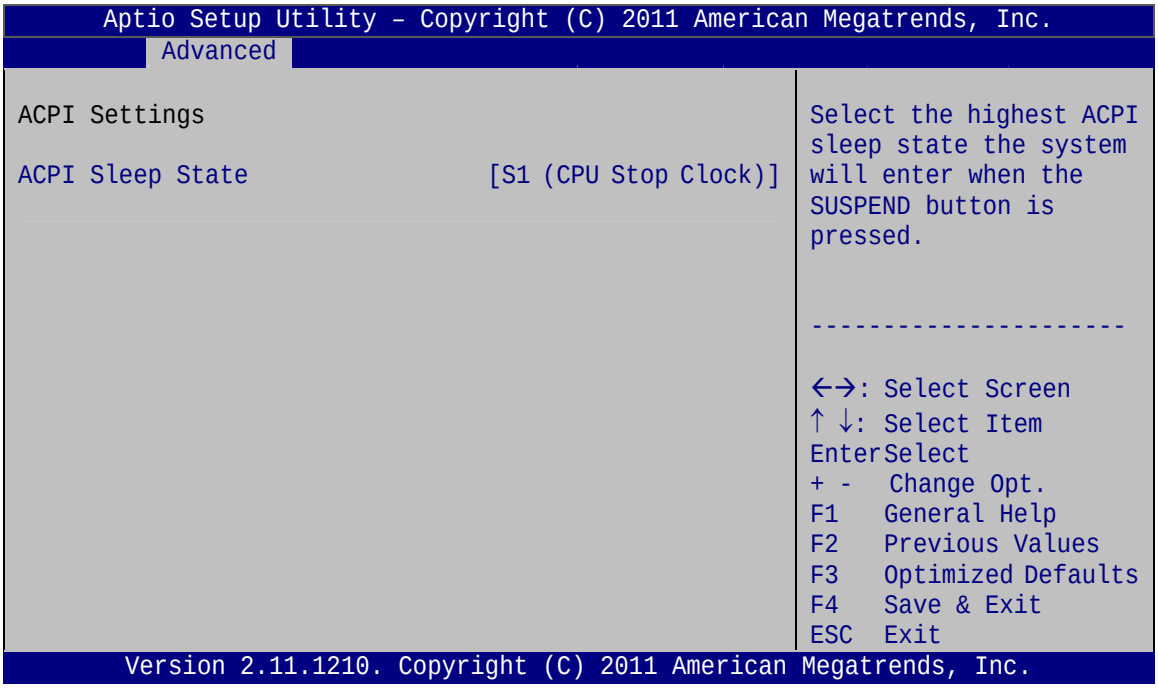
Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.

```
        Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
  Main    Advanced   Chipset    Boot    Security   Save & Exit

> ACPI Settings                                   System ACPI Parameters
> RTC Wake Settings
> Trusted Computing
> CPU Configuration
> SATA Configuration                              ----------------------
> Intel(R) Rapid Start Technology
> AMT Configuration                               ←→: Select Screen
> USB Configuration                               ↑ ↓: Select Item
> F81866 Super IO Configuration                   EnterSelect
> iWDD H/W Monitor                                + -   Change Opt.
> Serial Port Console Configuration               F1    General Help
> iEi Feature                                     F2    Previous Values
                                                  F3    Optimized Defaults
                                                  F4    Save & Exit
                                                  ESC   Exit
        Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 2: Advanced

5.3.1 ACPI Settings

The **ACPI Settings** menu (**BIOS Menu 3**) configures the Advanced Configuration and Power Interface (ACPI) options.


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
ACPI Settings
ACPI Sleep State [S1 (CPU Stop Clock)]
Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
←→: Select Screen
↑ ↓: Select Item
Enter Select
+ - Change Opt.
F1 General Help
F2 Previous Values
F3 Optimized Defaults
F4 Save & Exit
ESC Exit
Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.

BIOS Menu 3: ACPI Configuration

➔ **ACPI Sleep State [S1 (CPU Stop Clock)]**

Use the **ACPI Sleep State** option to specify the sleep state the system enters when it is not being used.

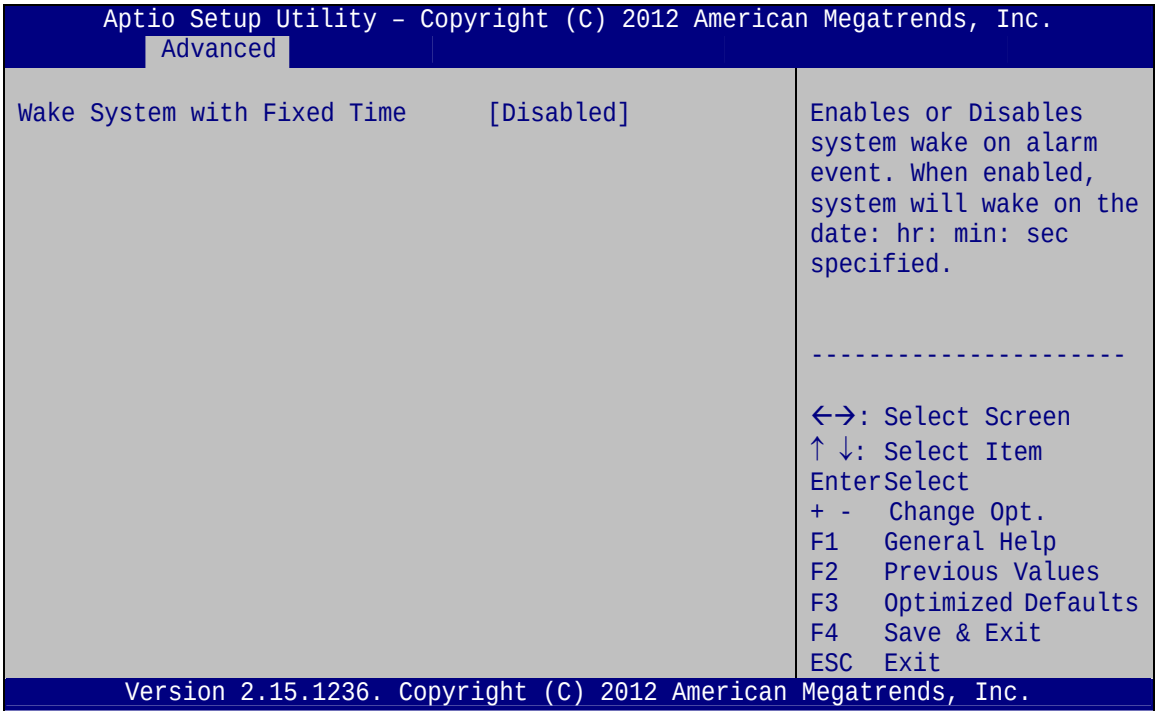
➔ **Suspend Disabled**

➔ **S1 (CPU Stop Clock)** **DEFAULT** The system enters S1(POS) sleep state. The system appears off. The CPU is stopped; RAM is refreshed; the system is running in a low power mode.

➔ **S3 (Suspend to RAM)** The caches are flushed and the CPU is powered off. Power to the RAM is maintained. The computer returns slower to a working state, but more power is saved.

5.3.2 RTC Wake Settings

The **RTC Wake Settings** menu (**BIOS Menu 4**) configures RTC wake event. The RTC wake function is supported in ACPI (S3/S4/S5) and APM soft off modes.


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Advanced
Wake System with Fixed Time [Disabled]
Enables or Disables system wake on alarm event. When enabled, system will wake on the date: hr: min: sec specified.

←→: Select Screen
↑ ↓: Select Item
Enter Select
+ - Change Opt.
F1 General Help
F2 Previous Values
F3 Optimized Defaults
F4 Save & Exit
ESC Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

BIOS Menu 4: RTC Wake Settings

➔ **Wake System with Fixed Time [Disabled]**

Use the **Wake System with Fixed Time** option to specify the time the system should be roused from a suspended state.

➔ **Disabled** **DEFAULT** The real time clock (RTC) cannot generate a wake event

➔ **Enabled**

If selected, the following appears with values that can be selected:

*Wake up every day

*Wake up date

*Wake up hour

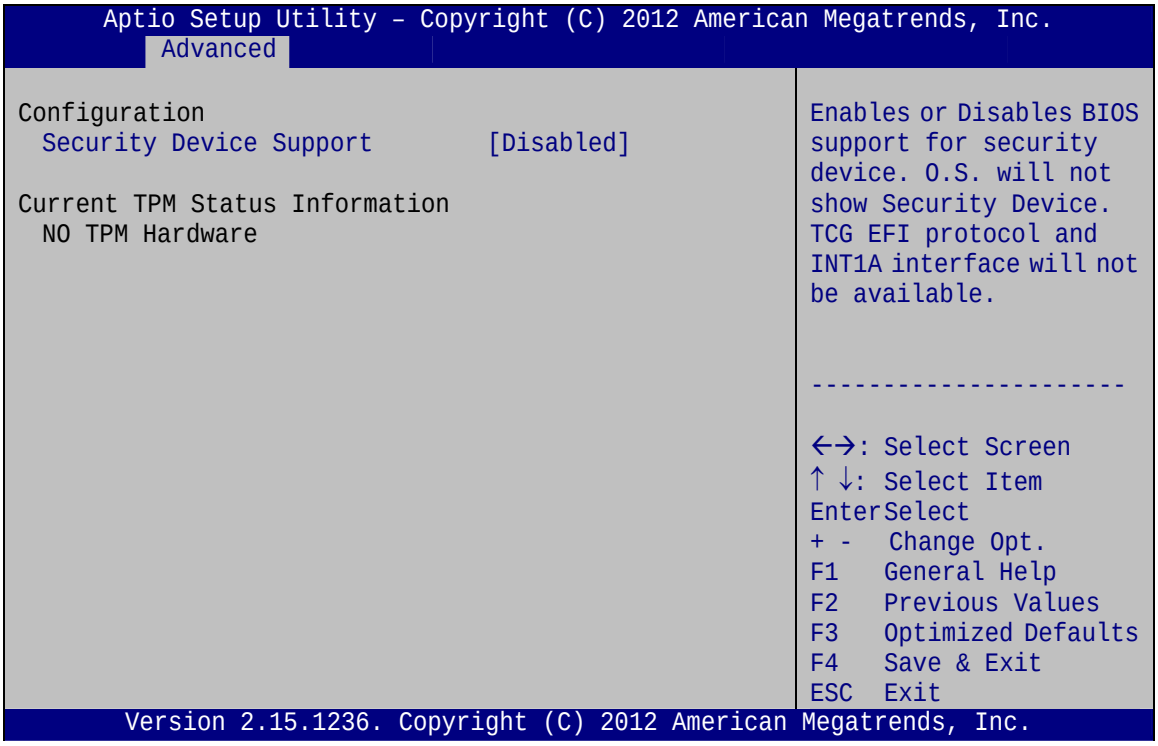
*Wake up minute

*Wake up second

After setting the alarm, the computer turns itself on from a suspend state when the alarm goes off.

5.3.3 Trusted Computing

Use the **Trusted Computing** menu (**BIOS Menu 5**) to configure settings related to the Trusted Computing Group (TCG) Trusted Platform Module (TPM).


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Advanced
Configuration
Security Device Support [Disabled]
Current TPM Status Information
NO TPM Hardware
Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
←→: Select Screen
↑ ↓: Select Item
Enter Select
+ - Change Opt.
F1 General Help
F2 Previous Values
F3 Optimized Defaults
F4 Save & Exit
ESC Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

BIOS Menu 5: Trusted Computing

➔ **Security Device Support [Disable]**

Use the **Security Device Support** option to configure support for security devices.

➔ **Disable** **DEFAULT** Security Device support is disabled.

➔ **Enable** Security Device support is enabled.

5.3.4 CPU Information

Use the **CPU Information** submenu (**BIOS Menu 6**) to view detailed CPU specifications and configure the CPU.

```
      Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
          Advanced
 CPU Information                                  | Enable for Windows XP and
                                                  | Linux (OS optimized for
 Intel® COR(TM) i3-4330 CPU @ 3.50GHz             | Hyper-Threading
 Signature                        306c3           | Technology and Disabled
 Microcode Patch                  16              | for other OS (OS not
 Max CPU Speed                    3500 MHz        | optimized for
 Min CPU Speed                    800 MHz         | Hyper-Threading
 CPU Speed                        3500 MHz        | Technology). When
 Processor Cores                  2               | Disabled only one thread
 Intel HT Technology              Supported       | per enabled core is
 Intel VT-x Technology            Supported       | enabled.
 Intel SMX Technology             Not Supported   |
 64-bit                           Supported       |
 EIST Technology                  Supported       | ----------------------
                                                  |
 L1 Data ache                     32 kB x 2       | ←→: Select Screen
 L1 Code Cache                    32 kB x 2       | ↑ ↓: Select Item
 L2 Cache                         256 kB x 2      | EnterSelect
 L3 Cache                         4096 kB         | + -   Change Opt.
                                                  | F1    General Help
 Hyper-Threading                  [Enabled]       | F2    Previous Values
 Active Processor Cores           [All]           | F3    Optimized Defaults
 Intel Virtualization Technology  [Disabled]      | F4    Save & Exit
 EIST                             [Enabled]       | ESC   Exit
      Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 6: CPU Information

The CPU Configuration menu (**BIOS Menu 6**) lists the following CPU details:

- Processor Type: Lists the brand name of the CPU being used
- CPU Signature: Lists the CPU signature value.

- Microcode Patch: Lists the microcode patch being used.
- Max CPU Speed: Lists the maximum CPU processing speed.
- Min CPU Speed: Lists the minimum CPU processing speed.
- CPU Speed: Lists the CPU processing speed.
- Processor Cores: Lists the number of the processor core
- Intel HT Technology: Indicates if Intel HT Technology is supported by the CPU.
- Intel VT-x Technology: Indicates if Intel VT-x Technology is supported by the CPU.
- Intel SMX Technology: Indicates if Intel SMX Technology is supported by the CPU.
- EIST Technology: Indicates if Enhanced Intel SpeedStep® Techonology is supported by the CPU.
- L1 Data Cache: Lists the amount of data storage space on the L1 cache.
- L1 Code Cache: Lists the amount of code storage space on the L1 cache.
- L2 Cache: Lists the amount of storage space on the L2 cache.
- L3 Cache: Lists the amount of storage space on the L3 cache.

➔ **Hyper-threading [Enabled]**

Use the **Hyper-threading** BIOS option to enable or disable the Intel Hyper-Threading Technology.

➔	**Disabled**		Disables the Intel Hyper-Threading Technology.
➔	**Enabled**	**DEFAULT**	Enables the Intel Hyper-Threading Technology.

➔ **Active Processor Cores [All]**

Use the **Active Processor Cores** BIOS option to enable numbers of cores in the processor package.

➔	**All**	**DEFAULT**	Enable all cores in the processor package.
➔	**1**		Enable one core in the processor package.

➔ **Intel Virtualization Technology [Disabled]**

Use the **Intel Virtualization Technology** option to enable or disable virtualization on the system. When combined with third party software, Intel® Virtualization technology allows several OSs to run on the same system at the same time.

➔ **Disabled**	**DEFAULT**	Disables Intel Virtualization Technology.
➔ **Enabled**		Enables Intel Virtualization Technology.

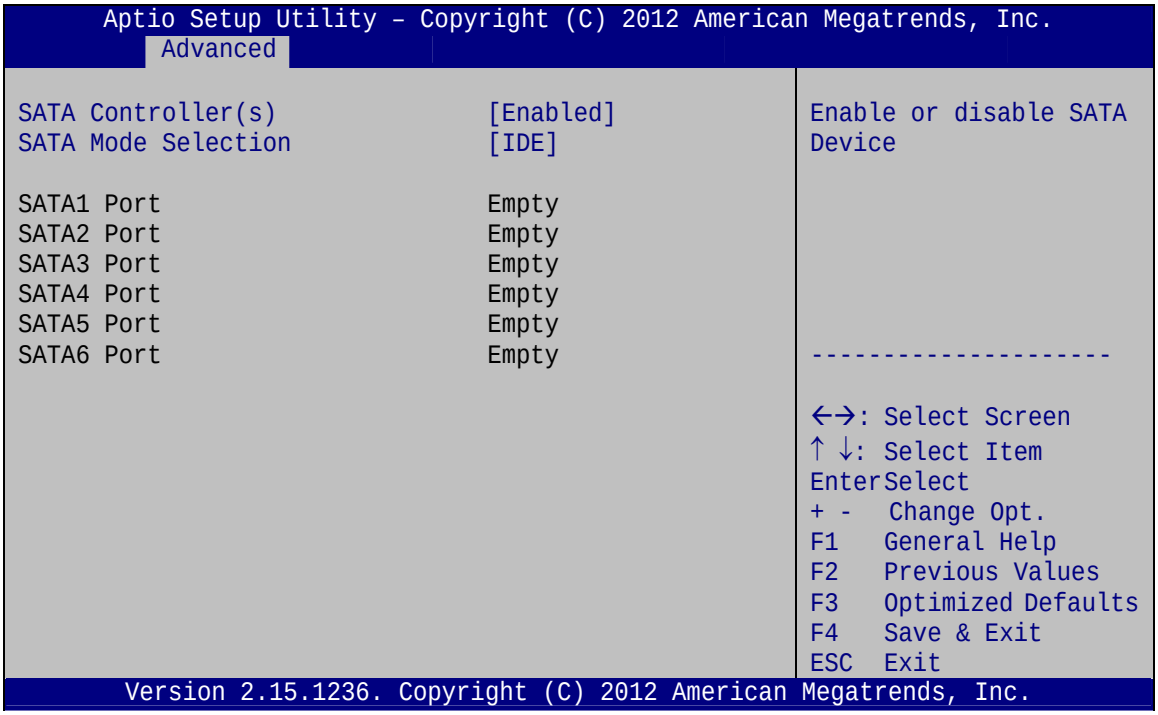
➔ **EIST [Enabled]**

Use the **EIST** option to enable or disable Enhanced Intel SpeedStep® Techonology (EIST).

➔ **Disabled**		Disables Enhanced Intel SpeedStep® Techonology.
➔ **Enabled**	**DEFAULT**	Enables Enhanced Intel SpeedStep® Techonology.

5.3.5 SATA Configuration

Use the **SATA Configuration** menu (**BIOS Menu 7**) to change and/or set the configuration of the SATA devices installed in the system.



BIOS Menu 7: SATA Configuration

➔ **SATA Controller(s) [Enabled]**

Use the **SATA Controller(s)** option to enable or disable the serial ATA controller.

- ➔ **Enabled** **DEFAULT** Enables the on-board SATA controller.
- ➔ **Disabled** Disables the on-board SATA controller.

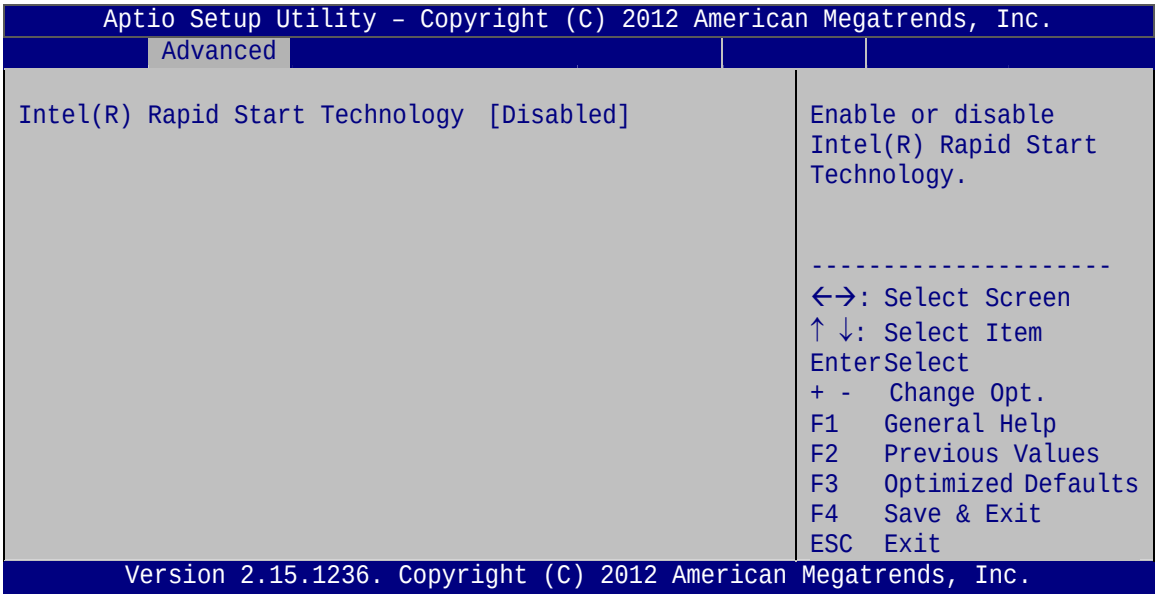
➔ **SATA Mode Selection [IDE]**

Use the **SATA Mode Selection** option to configure SATA devices as normal IDE devices.

- ➔ **IDE** **DEFAULT** Configures SATA devices as normal IDE device.
- ➔ **AHCI** Configures SATA devices as AHCI device.
- ➔ **RAID** Configures SATA devices as RAID device.

5.3.6 Intel(R) Rapid Start Technology

Use the **Intel(R) Rapid Start Technology** menu to configure Intel® Rapid Start Technology support.


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Advanced
Intel(R) Rapid Start Technology [Disabled]
Enable or disable Intel(R) Rapid Start Technology.
←→: Select Screen
↑ ↓: Select Item
Enter Select
+ - Change Opt.
F1 General Help
F2 Previous Values
F3 Optimized Defaults
F4 Save & Exit
ESC Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

BIOS Menu 8: Intel(R) Rapid Start Technology

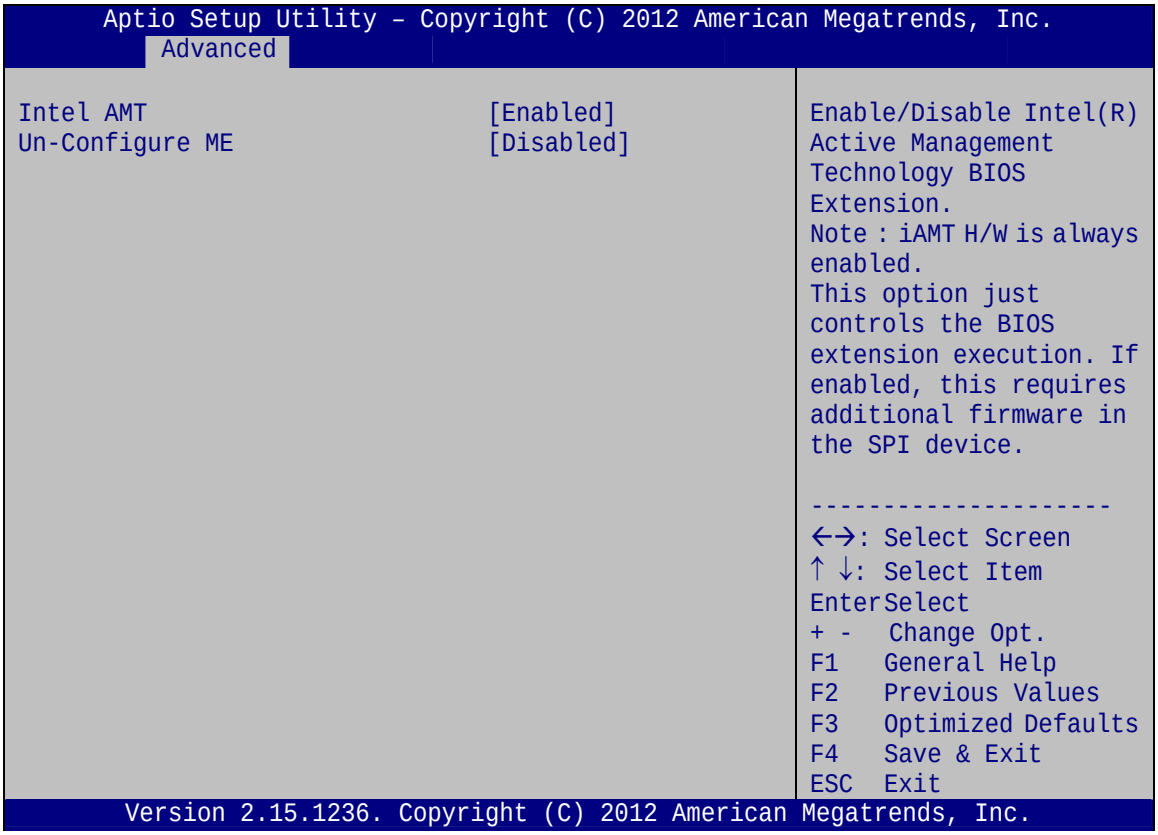
➔ **Intel(R) Rapid Start Technology [Disabled]**

Use **Intel(R) Rapid Start Technology** option to enable or disable the Intel® Rapid Start Technology function.

➔	**Disabled**	**DEFAULT**	Intel® Rapid Start Technology is disabled
➔	**Enabled**		Intel® Rapid Start Technology is enabled

5.3.7 AMT Configuration

The **AMT Configuration** submenu (**BIOS Menu 9**) allows Intel® Active Management Technology (AMT) options to be configured.


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Advanced
Intel AMT [Enabled]
Un-Configure ME [Disabled]
Enable/Disable Intel(R) Active Management Technology BIOS Extension.
Note : iAMT H/W is always enabled.
This option just controls the BIOS extension execution. If enabled, this requires additional firmware in the SPI device.
←→: Select Screen
↑ ↓: Select Item
Enter Select
+ - Change Opt.
F1 General Help
F2 Previous Values
F3 Optimized Defaults
F4 Save & Exit
ESC Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

BIOS Menu 9: AMT Configuration

➔ **Intel AMT [Enabled]**

Use **Intel AMT** option to enable or disable the Intel® AMT BIOS Extension.

➔ **Disabled** Intel® AMT BIOS Extension is disabled

➔ **Enabled** **DEFAULT** Intel® AMT BIOS Extension is enabled

➔ **Unconfigure ME [Disabled]**

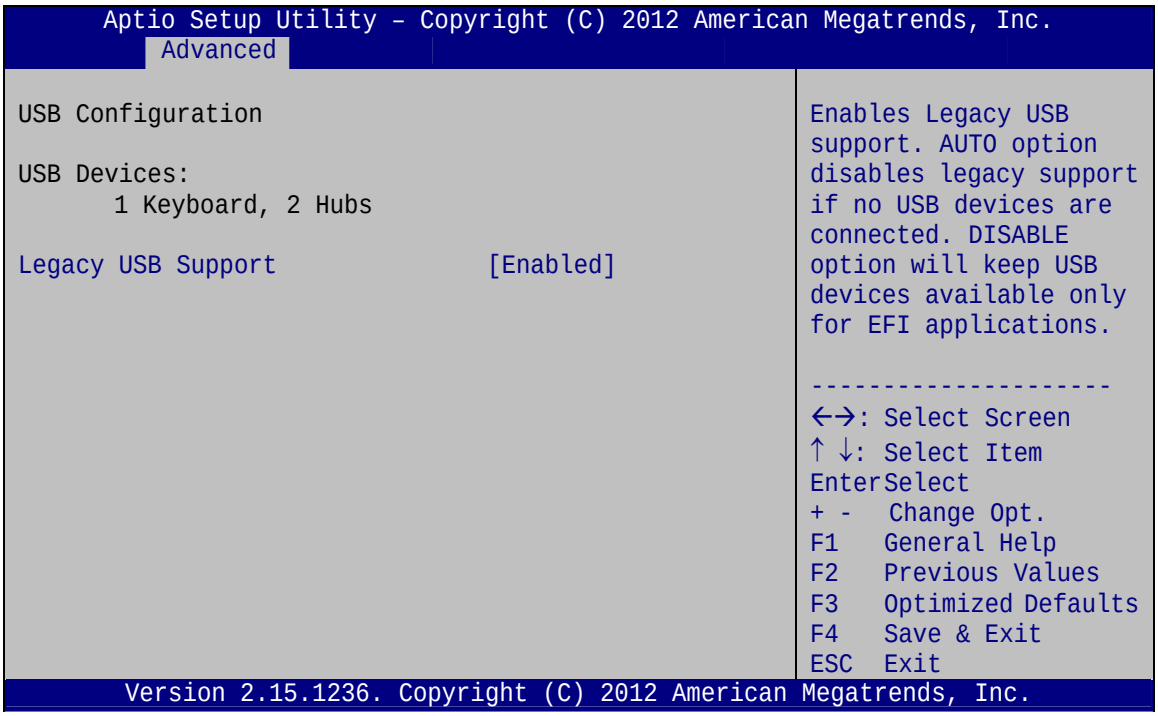
Use the **Unconfigure ME** option to perform ME unconfigure without password operation.

➔ **Disabled** **DEFAULT** Disable ME unconfigure

➔ **Enabled** Enable ME unconfigure

5.3.8 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 10**) to read USB configuration information and configure the USB settings.


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Advanced
USB Configuration
USB Devices:
1 Keyboard, 2 Hubs
Legacy USB Support [Enabled]
Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
←→: Select Screen
↑ ↓: Select Item
Enter Select
+ - Change Opt.
F1 General Help
F2 Previous Values
F3 Optimized Defaults
F4 Save & Exit
ESC Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

BIOS Menu 10: USB Configuration

➔ **USB Devices**

The **USB Devices Enabled** field lists the USB devices that are enabled on the system

➔ **Legacy USB Support [Enabled]**

Use the **Legacy USB Support** BIOS option to enable USB mouse and USB keyboard support. Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB driver loaded onto the system.

➔	**Enabled**	**DEFAULT**	Legacy USB support enabled
➔	**Disabled**		Legacy USB support disabled
➔	**Auto**		Legacy USB support disabled if no USB devices are connected

5.3.9 F81866 Super IO Configuration

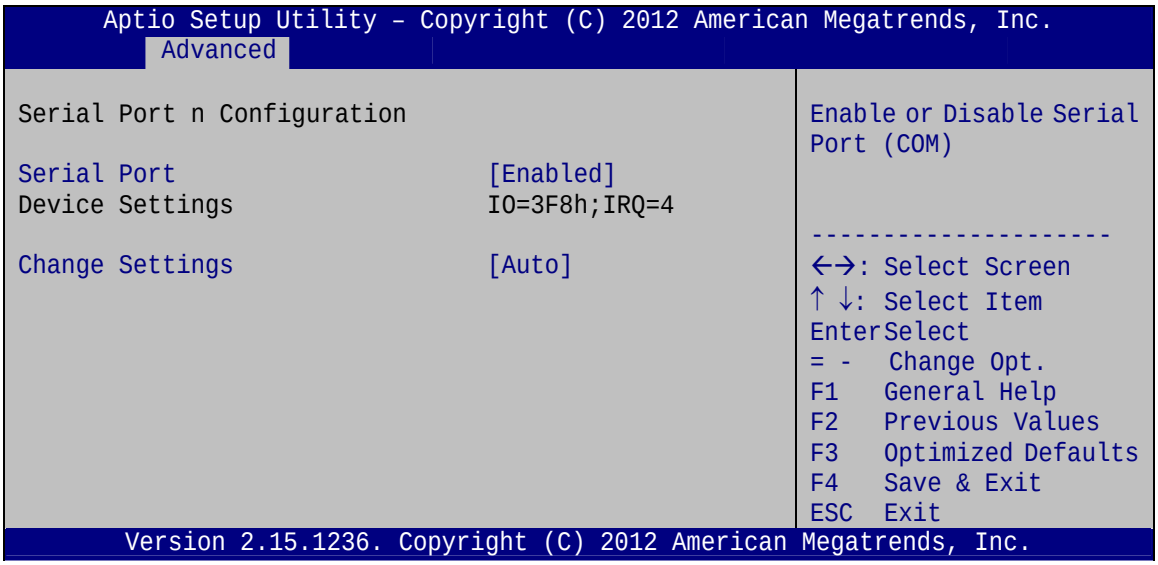
Use the **F81866 Super IO Configuration** menu (**BIOS Menu 11**) to set or change the configurations for the FDD controllers, parallel ports and serial ports.

```
      Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
          Advanced
 F81866 Super IO Configuration                  | Set Parameters of Serial
                                                | Port 1 (COMA)
 F81866 Super IO Chip            F81866         |
 > Serial Port 1 Configuration                  |
 > Serial Port 2 Configuration                  | ---------------------
 > Serial Port 3 Configuration                  | ←→: Select Screen
 > Serial Port 4 Configuration                  | ↑ ↓: Select Item
 > Serial Port 5 Configuration                  | Enter Select
 > Serial Port 6 Configuration                  | + -   Change Opt.
 > Parallel Port Configuration                  | F1    General Help
                                                | F2    Previous Values
                                                | F3    Optimized Defaults
                                                | F4    Save & Exit
                                                | ESC   Exit
      Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 11: F81866 Super IO Configuration

5.3.9.1 Serial Port n Configuration

Use the **Serial Port n Configuration** menu (**BIOS Menu 12**) to configure the serial port n.



BIOS Menu 12: Serial Port n Configuration Menu

5.3.9.1.1 Serial Port 1 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

➔	**Disabled**		Disable the serial port
➔	**Enabled**	**DEFAULT**	Enable the serial port

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔	**Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔	**IO=3F8h; IRQ=4**		Serial Port I/O port address is 3F8h and the interrupt address is IRQ4

➔ **IO=3F8h; IRQ=3, 4**		Serial Port I/O port address is 3F8h and the interrupt address is IRQ3,4
➔ **IO=2C0h; IRQ=3, 4**		Serial Port I/O port address is 2C0h and the interrupt address is IRQ3, 4
➔ **IO=2C8h; IRQ=3, 4**		Serial Port I/O port address is 2C8h and the interrupt address is IRQ3, 4

5.3.9.1.2 Serial Port 2 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

➔ **Disabled**		Disable the serial port
➔ **Enabled**	**DEFAULT**	Enable the serial port

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔ **Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔ **IO=2F8h; IRQ=3**		Serial Port I/O port address is 2F8h and the interrupt address is IRQ3
➔ **IO=3F8h; IRQ=3, 4**		Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4
➔ **IO=2F8h; IRQ=3, 4**		Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4
➔ **IO=2C0h; IRQ=3, 4**		Serial Port I/O port address is 2C0h and the interrupt address is IRQ3, 4
➔ **IO=2C8h; IRQ=3, 4**		Serial Port I/O port address is 2C8h and the interrupt address is IRQ3, 4

➔ **Device Mode [RS422/485]**

Use the **Device Mode** option to configure the COM2 serial port.

➔ **RS422/485** **DEFAULT** Enables serial port RS422/485 support.

5.3.9.1.3 Serial Port 3 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

➔ **Disabled** Disable the serial port

➔ **Enabled** **DEFAULT** Enable the serial port

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔ **Auto** **DEFAULT** The serial port IO port address and interrupt address are automatically detected.

➔ **IO=2D0h; IRQ=10** Serial Port I/O port address is 2D0h and the interrupt address is IRQ10

➔ **IO=2D0h; IRQ=10, 11** Serial Port I/O port address is 2D0h and the interrupt address is IRQ10, 11

➔ **IO=2E8h; IRQ=10, 11** Serial Port I/O port address is 2E8h and the interrupt address is IRQ10, 11

➔ **IO=2D8h; IRQ=10, 11** Serial Port I/O port address is 2D8h and the interrupt address is IRQ10, 11

5.3.9.1.4 Serial Port 4 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

➔	**Disabled**		Disable the serial port
➔	**Enabled**	**DEFAULT**	Enable the serial port

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔	**Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔	**IO=2E8h; IRQ=10**		Serial Port I/O port address is 2E8h and the interrupt address is IRQ10
➔	**IO=3E8h; IRQ=10, 11**		Serial Port I/O port address is 3E8h and the interrupt address is IRQ10, 11
➔	**IO=2E8h; IRQ=10, 11**		Serial Port I/O port address is 2E8h and the interrupt address is IRQ10, 11
➔	**IO=2D0h; IRQ=10, 11**		Serial Port I/O port address is 2D0h and the interrupt address is IRQ10, 11
➔	**IO=2D8h; IRQ=10, 11**		Serial Port I/O port address is 2D8h and the interrupt address is IRQ10, 11

➔ **Device Mode [RS422/485]**

Use the **Device Mode** option to configure the serial port 4.

➔	**RS422/485**	**DEFAULT**	COM4 is configured as RS-422/485 serial port.

5.3.9.1.5 Serial Port 5 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

➔	**Disabled**		Disable the serial port

➔ **Enabled** **DEFAULT** Enable the serial port

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔ **Auto** **DEFAULT** The serial port IO port address and interrupt address are automatically detected.

➔ **IO=2D0h; IRQ=10** Serial Port I/O port address is 2D0h and the interrupt address is IRQ10

➔ **IO=2C0h; IRQ=10, 11** Serial Port I/O port address is 2C0h and the interrupt address is IRQ10, 11

➔ **IO=2C8h; IRQ=10, 11** Serial Port I/O port address is 2C8h and the interrupt address is IRQ10, 11

➔ **IO=2D0h; IRQ=10, 11** Serial Port I/O port address is 2D0h and the interrupt address is IRQ10, 11

➔ **IO=2D8h; IRQ=10, 11** Serial Port I/O port address is 2D8h and the interrupt address is IRQ10, 11

➔ **IO=2E0h; IRQ=10, 11** Serial Port I/O port address is 2E0h and the interrupt address is IRQ10, 11

5.3.9.1.6 Serial Port 6 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

➔ **Disabled** Disable the serial port

➔ **Enabled** **DEFAULT** Enable the serial port

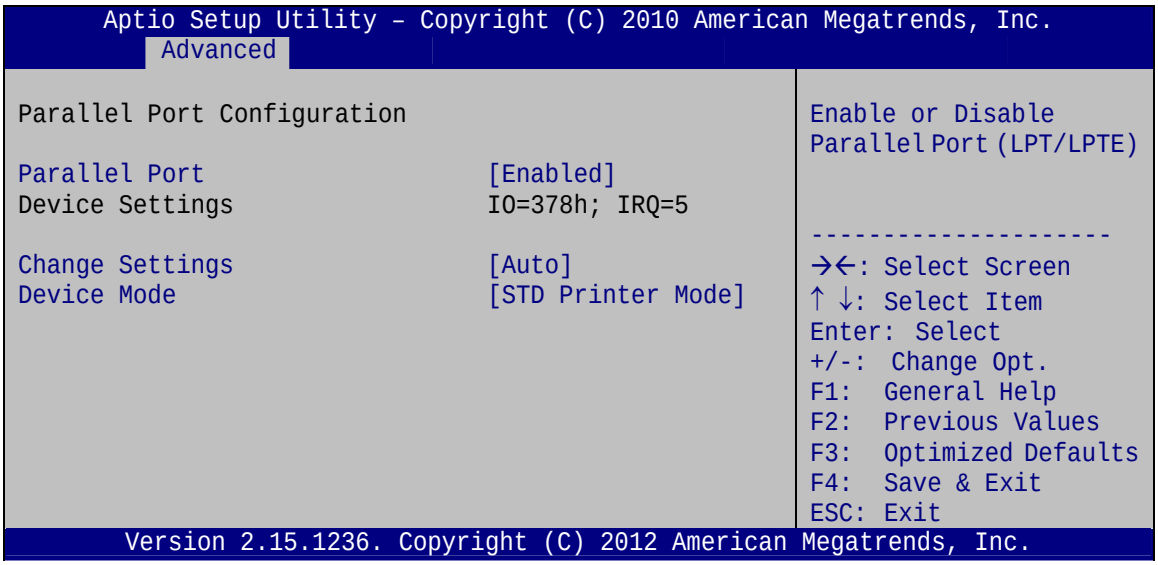
➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔ **Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔ **IO=2D8h; IRQ=10**		Serial Port I/O port address is 2D8h and the interrupt address is IRQ10
➔ **IO=2C0h; IRQ=10, 11**		Serial Port I/O port address is 2C0h and the interrupt address is IRQ10, 11
➔ **IO=2C8h; IRQ=10, 11**		Serial Port I/O port address is 2C8h and the interrupt address is IRQ10, 11
➔ **IO=2D0h; IRQ=10, 11**		Serial Port I/O port address is 2D0h and the interrupt address is IRQ10, 11
➔ **IO=2D8h; IRQ=10, 11**		Serial Port I/O port address is 2D8h and the interrupt address is IRQ10, 11
➔ **IO=2E0h; IRQ=10, 11**		Serial Port I/O port address is 2E0h and the interrupt address is IRQ10, 11

5.3.9.2 Parallel Port Configuration

Use the **Parallel Port Configuration** menu (**BIOS Menu 13**) to configure the serial port n.



BIOS Menu 13: Parallel Port Configuration Menu

➔ **Parallel Port [Enabled]**

Use the **Parallel Port** option to enable or disable the parallel port.

➔ **Disabled**		Disable the parallel port
➔ **Enabled**	**DEFAULT**	Enable the parallel port

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the parallel port IO port address and interrupt address.

➔ **Auto**	**DEFAULT**	The parallel port IO port address and interrupt address are automatically detected.
➔ **IO=378h; IRQ=5**		Parallel Port I/O port address is 378h and the interrupt address is IRQ5
➔ **IO=378h; IRQ=5, 7**		Parallel Port I/O port address is 378h and the interrupt address is IRQ5, 7

➔ **IO=278h; IRQ=5, 7** — Parallel Port I/O port address is 278h and the interrupt address is IRQ5, 7

➔ **IO=3BCh; IRQ=5, 7** — Parallel Port I/O port address is 3BCh and the interrupt address is IRQ5, 7

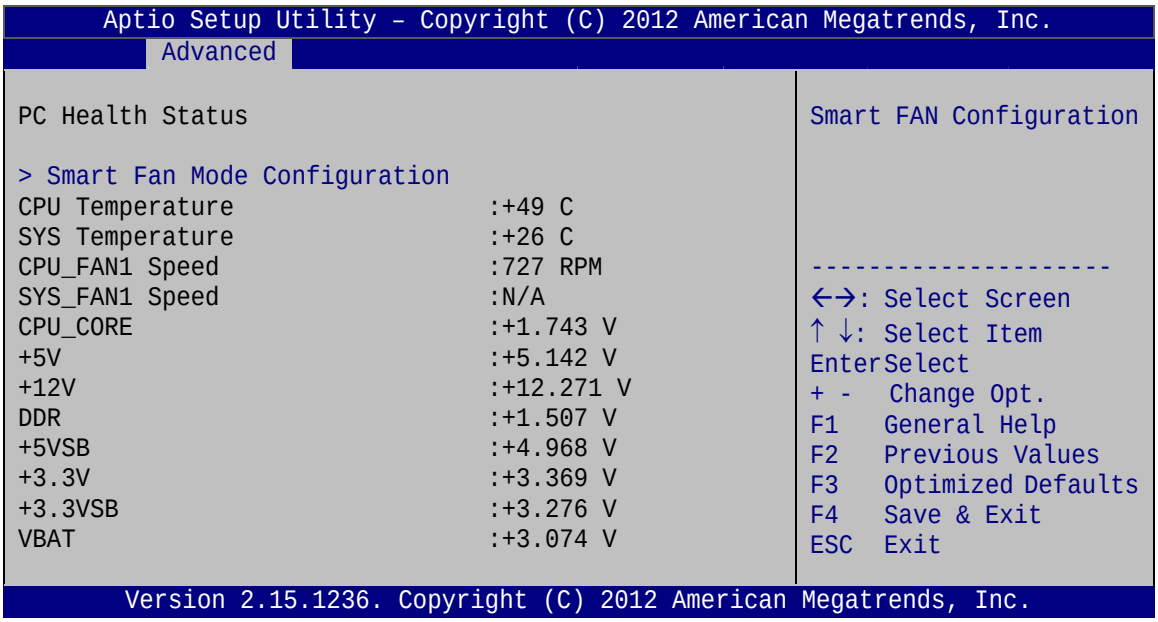
➔ **Device Mode [STD Printer Mode]**

Use the **Device Mode** option to select the mode the parallel port operates in. Configuration options are listed below.

- STD Printer Mode **Default**
- SPP Mode
- EPP-1.9 and SPP Mode
- EPP-1.7 and SPP Mode
- ECP Mode
- ECP and EPP 1.9 Mode
- ECP and EPP 1.7 Mode

5.3.10 iWDD H/W Monitor

The **iWDD H/W Monitor** menu (**BIOS Menu 14**) contains the fan configuration submenus and displays operating temperature, fan speeds and system voltages.



BIOS Menu 14: iWDD H/W Monitor

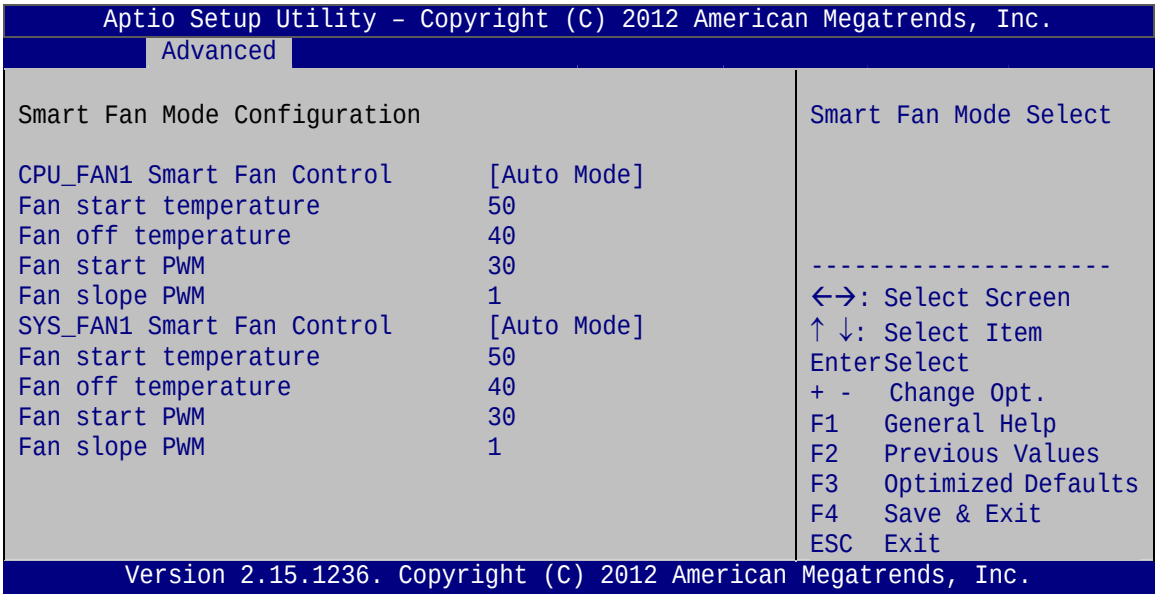
➔ **PC Health Status**

The following system parameters and values are shown. The system parameters that are monitored are:

- System Temperatures:
  - CPU Temperature
  - System Temperature
- Fan Speeds:
  - CPU Fan Speed
  - System Fan Speed
- Voltages:
  - CPU_CORE
  - +5V
  - +12V
  - DDR
  - +5VSB
  - +3.3V
  - +3.3VSB
  - VBAT

5.3.10.1 Smart Fan Mode Configuration

Use the **Smart Fan Mode Configuration** submenu (**BIOS Menu 15**) to configure smart fan temperature and speed settings.


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Advanced
Smart Fan Mode Configuration
CPU_FAN1 Smart Fan Control [Auto Mode]
Fan start temperature 50
Fan off temperature 40
Fan start PWM 30
Fan slope PWM 1
SYS_FAN1 Smart Fan Control [Auto Mode]
Fan start temperature 50
Fan off temperature 40
Fan start PWM 30
Fan slope PWM 1
Smart Fan Mode Select
←→: Select Screen
↑ ↓: Select Item
Enter Select
+ - Change Opt.
F1 General Help
F2 Previous Values
F3 Optimized Defaults
F4 Save & Exit
ESC Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

BIOS Menu 15: Smart Fan Mode Configuration

➔ **CPU_FAN1 Smart Fan Control/SYS_FAN1 Smart Fan Control [Auto Mode]**

Use the **CPU_FAN1 Smart Fan Control/SYS_FAN1 Smart Fan Control** option to configure the CPU/System Smart Fan.

➔ **Auto Mode** **DEFAULT** The fan adjusts its speed using Auto Mode settings.

➔ **Manual Mode** The fan spins at the speed set in Manual Mode settings.

➔ **Fan start/off temperature**

Use the + or – key to change the **Fan start/off temperature** value. Enter a decimal number between 1 and 100.

➔ **Fan start PWM**

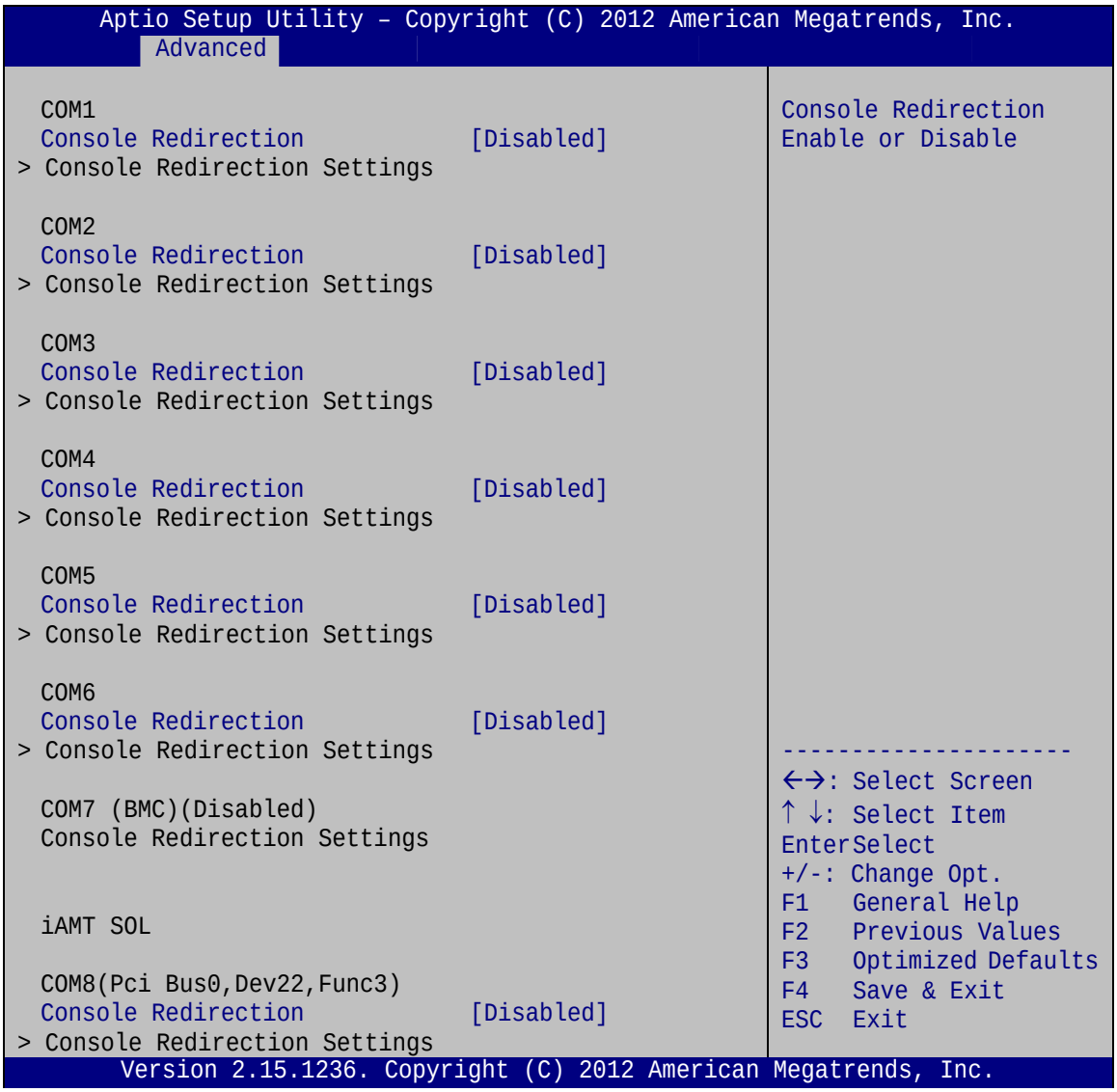
Use the + or – key to change the **Fan start PWM** value. Enter a decimal number between 1 and 128.

➔ **Fan slope PWM**

Use the + or – key to change the **Fan slope PWM** value. Enter a decimal number between 1 and 64.

5.3.11 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 16**) allows the console redirection options to be configured. Console redirection allows users to maintain a system remotely by re-directing keyboard input and text output through the serial port.



BIOS Menu 16: Serial Port Console Redirection

➔ **Console Redirection [Disabled]**

Use **Console Redirection** option to enable or disable the console redirection function.

➔ **Disabled** **DEFAULT** Disabled the console redirection function

➔ **Enabled** Enabled the console redirection function

The following options are available in the **Console Redirection Settings** submenu when the Console Redirection option is enabled.

➔ **Terminal Type [ANSI]**

Use the **Terminal Type** option to specify the remote terminal type.

➔ **VT100**		The target terminal type is VT100
➔ **VT100+**		The target terminal type is VT100+
➔ **VT-UTF8**		The target terminal type is VT-UTF8
➔ **ANSI**	**DEFAULT**	The target terminal type is ANSI

➔ **Bits per second [115200]**

Use the **Bits per second** option to specify the serial port transmission speed. The speed must match the other side. Long or noisy lines may require lower speeds.

➔ **9600**		Sets the serial port transmission speed at 9600.
➔ **19200**		Sets the serial port transmission speed at 19200.
➔ **57600**		Sets the serial port transmission speed at 57600.
➔ **115200**	**DEFAULT**	Sets the serial port transmission speed at 115200.

➔ **Data Bits [8]**

Use the **Data Bits** option to specify the number of data bits.

➔ **7**		Sets the data bits at 7.
➔ **8**	**DEFAULT**	Sets the data bits at 8.

➔ **Parity [None]**

Use the **Parity** option to specify the parity bit that can be sent with the data bits for detecting the transmission errors.

➔ **None**	**DEFAULT**	No parity bit is sent with the data bits.
➔ **Even**		The parity bit is 0 if the number of ones in the data bits is even.

➔	**Odd**	The parity bit is 0 if the number of ones in the data bits is odd.
➔	**Mark**	The parity bit is always 1. This option does not provide error detection.
➔	**Space**	The parity bit is always 0. This option does not provide error detection.

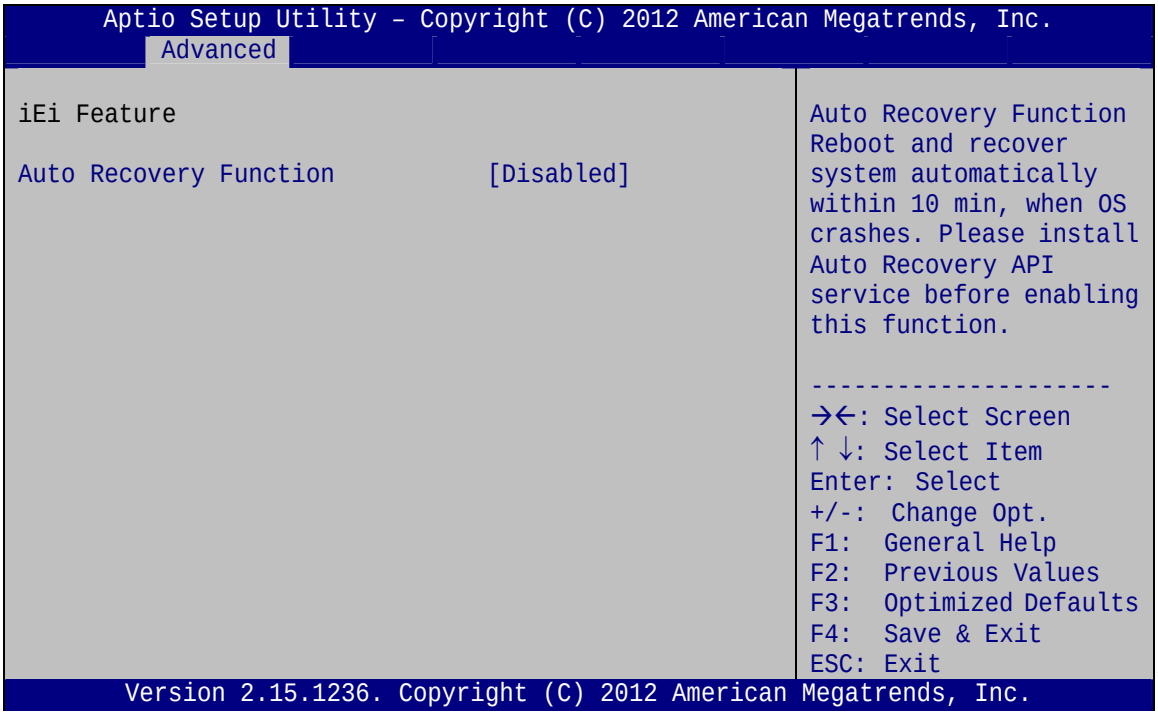
➔ **Stop Bits [1]**

Use the **Stop Bits** option to specify the number of stop bits used to indicate the end of a serial data packet. Communication with slow devices may require more than 1 stop bit.

➔	**1**	**DEFAULT**	Sets the number of stop bits at 1.
➔	**2**		Sets the number of stop bits at 2.

5.3.12 iEi Feature

Use the **iEi Feature** menu (**BIOS Menu 17**) to configure IEI One Key Recovery function.


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Advanced
iEi Feature
Auto Recovery Function [Disabled]
Auto Recovery Function
Reboot and recover system automatically within 10 min, when OS crashes. Please install Auto Recovery API service before enabling this function.
→←: Select Screen
↑ ↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

BIOS Menu 17: iEi Feature

➔ **Auto Recovery Function [Disabled]**

Use the **Auto Recovery Function** BIOS option to enable or disable the auto recovery function of the IEI One Key Recovery.

➔ **Disabled**	**DEFAULT**	Auto recovery function disabled
➔ **Enabled**		Auto recovery function enabled

5.4 Chipset

Use the **Chipset** menu (**BIOS Menu 18**) to access the PCH-IO and System Agent (SA) Subsystem configuration menus.

WARNING!

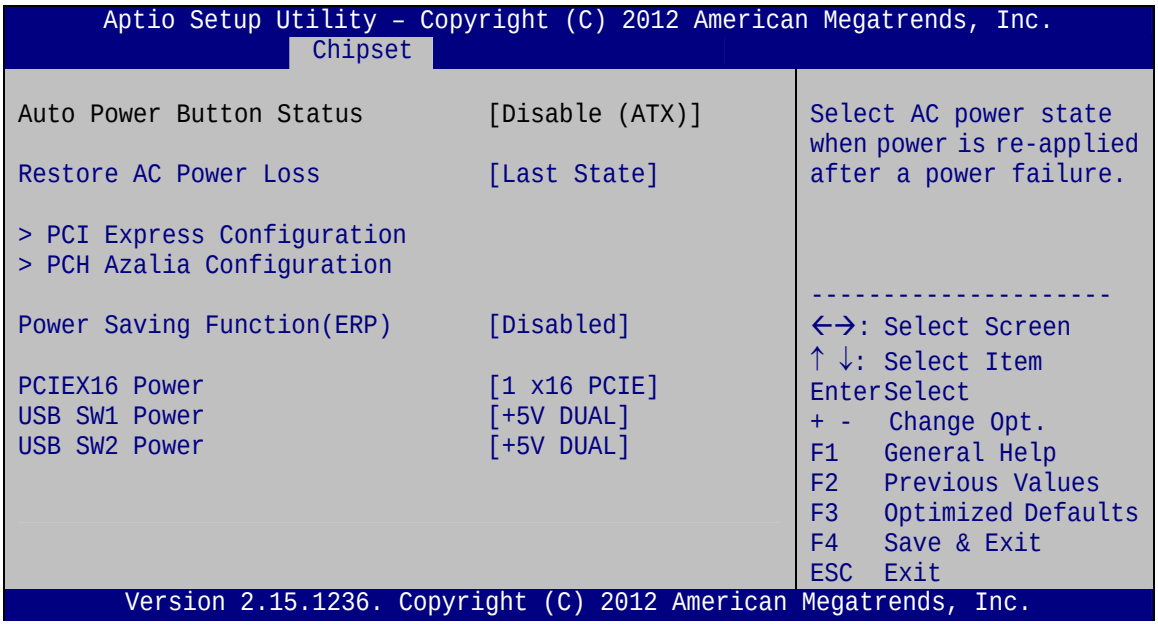
Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.

```
      Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
  Main    Advanced   Chipset    Boot    Security  Save & Exit

> PCH-IO Configuration                    PCH Parameters.
> System Agent (SA) Configuration


                                          ---------------------
                                          ←→: Select Screen
                                          ↑ ↓: Select Item
                                          EnterSelect
                                          + -   Change Opt.
                                          F1    General Help
                                          F2    Previous Values
                                          F3    Optimized Defaults
                                          F4    Save & Exit
                                          ESC   Exit
        Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 18: Chipset

5.4.1 PCH-IO Configuration

Use the **PCH-IO Configuration** menu (**BIOS Menu 19**) to configure the PCH chipset.


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Chipset
Auto Power Button Status [Disable (ATX)]
Restore AC Power Loss [Last State]
> PCI Express Configuration
> PCH Azalia Configuration
Power Saving Function(ERP) [Disabled]
PCIEX16 Power [1 x16 PCIE]
USB SW1 Power [+5V DUAL]
USB SW2 Power [+5V DUAL]
Select AC power state when power is re-applied after a power failure.
←→: Select Screen
↑ ↓: Select Item
Enter Select
+ - Change Opt.
F1 General Help
F2 Previous Values
F3 Optimized Defaults
F4 Save & Exit
ESC Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

BIOS Menu 19: PCH-IO Configuration

➔ **Restore on AC Power Loss [Last State]**

Use the **Restore on AC Power Loss** BIOS option to specify what state the system returns to if there is a sudden loss of power to the system.

➔ **Power Off** The system remains turned off

➔ **Power On** The system turns on

➔ **Last State** **DEFAULT** The system returns to its previous state. If it was on, it turns itself on. If it was off, it remains off.

➔ **Power Saving Function [Disabled]**

Use the **Power Saving Function** BIOS option to enable or reduce power consumption in the S5 state. When enabled, the system can only be powered-up using the power button.

➔ **Disabled** **DEFAULT** Power Saving Function support disabled

➔ **Enabled** Power Saving Function support enabled

➔ **PCIEX16 Power [1 x16 PCIE]**

Use the **PCIEX16 Power** BIOS option to configure the PCIe x16 channel mode on the motherboard.

➔ **1 x16 PCIE** **DEFAULT** Configure the PCIe x16 slot as one PCIe x16

➔ **USB SW1 Power [+5V DUAL]**

Use the **USB SW1 Power** BIOS option to configure the USB power source for the corresponding USB connector (**Table 5-2**).

➔ **+5V** Set the USB power source to +5V

➔ **+5V DUAL** **DEFAULT** Set the USB power source to +5V dual

➔ **USB SW2 Power [+5V DUAL]**

Use the **USB SW2 Power** BIOS option to configure the USB power source for the corresponding USB connector (**Table 5-2**).

➔ **+5V** Set the USB power source to +5V

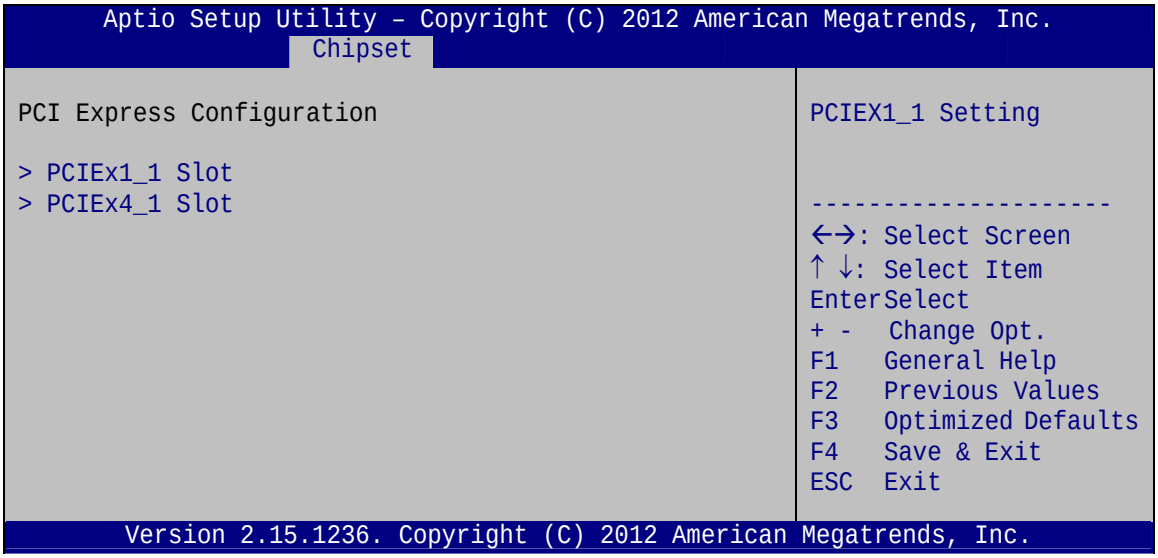
➔ **+5V DUAL** **DEFAULT** Set the USB power source to +5V dual

BIOS Options	Configured USB Ports
USB SW1 Power	K/M_USB1 (external USB 2.0 ports) LAN1_USB1 (external USB 3.0 ports)
USB SW2 Power	LAN2_USB2 (external USB 2.0 ports) USB1 (internal USB 2.0 ports) USB2 (internal USB 2.0 ports) CN4 (internal USB 3.0 ports)

Table 5-2: BIOS Options and Configured USB Ports

5.4.1.1 PCI Express Configuration

Use the **PCI Express Configuration** submenu (**BIOS Menu 20**) to configure the PCI Express slots.



BIOS Menu 20: PCI Express Configuration

➔ **PCIe Speed [Gen1]**

Use the **PCIe Speed** option to specify the PCI Express port speed. Configuration options are listed below.

- Auto
- Gen 1 **DEFAULT**
- Gen 2

➔ **Detect Non-Compliance Device [Enabled]**

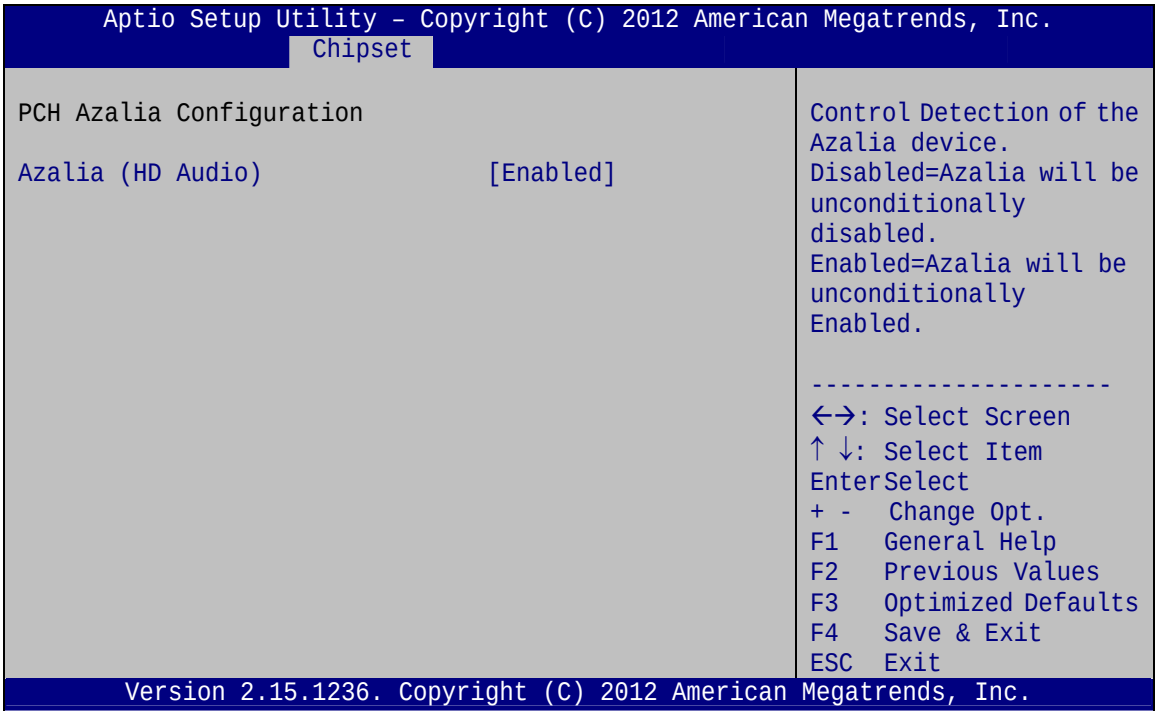
Use the **Detect Non-Compliance Device** option to configure whether to detect if a non-compliance PCI Express device is connected to the PCI Express port.

➔ **Disabled** Do not detect if a non-compliance PCI Express device is connected to the PCI Express port.

➔ **Enabled** **DEFAULT** Detect if a non-compliance PCI Express device is connected to the PCI Express port.

5.4.1.2 PCH Azalia Configuration

Use the **PCH Azalia Configuration** submenu (**BIOS Menu 21**) to configure the PCH Azalia codec.


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Chipset
PCH Azalia Configuration
Azalia (HD Audio) [Enabled]
Control Detection of the Azalia device.
Disabled=Azalia will be unconditionally disabled.
Enabled=Azalia will be unconditionally Enabled.
←→: Select Screen
↑ ↓: Select Item
Enter Select
+ - Change Opt.
F1 General Help
F2 Previous Values
F3 Optimized Defaults
F4 Save & Exit
ESC Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

BIOS Menu 21: PCH Azalia Configuration

➔ **Azalia [Enabled]**

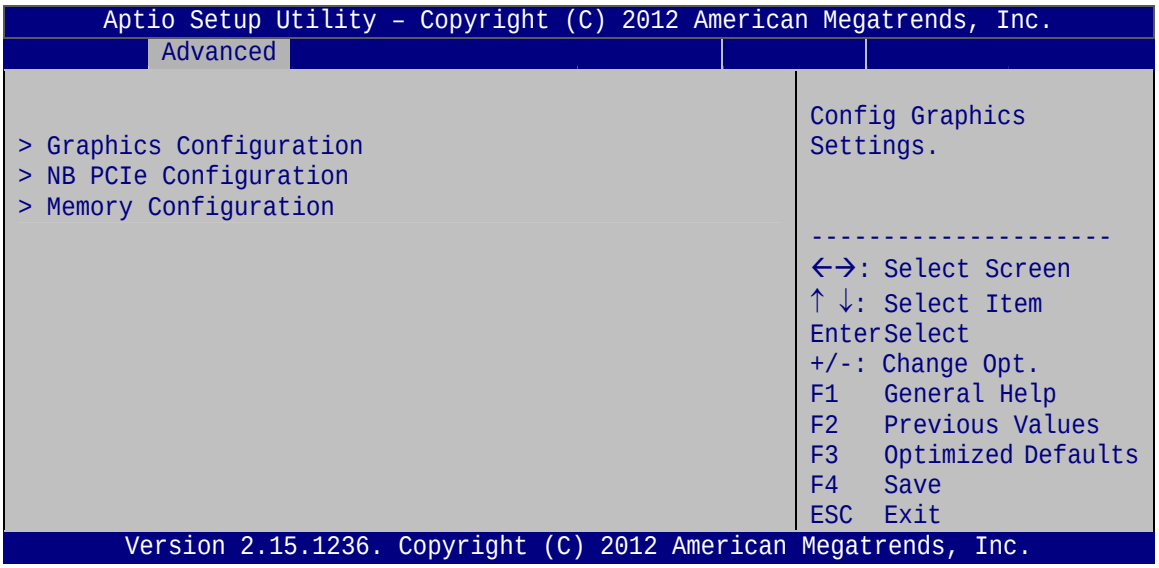
Use the **Azalia** option to enable or disable the High Definition Audio controller.

➔ **Disabled** The onboard High Definition Audio controller is disabled

➔ **Enabled** **DEFAULT** The onboard High Definition Audio controller is detected automatically and enabled

5.4.2 System Agent (SA) Configuration

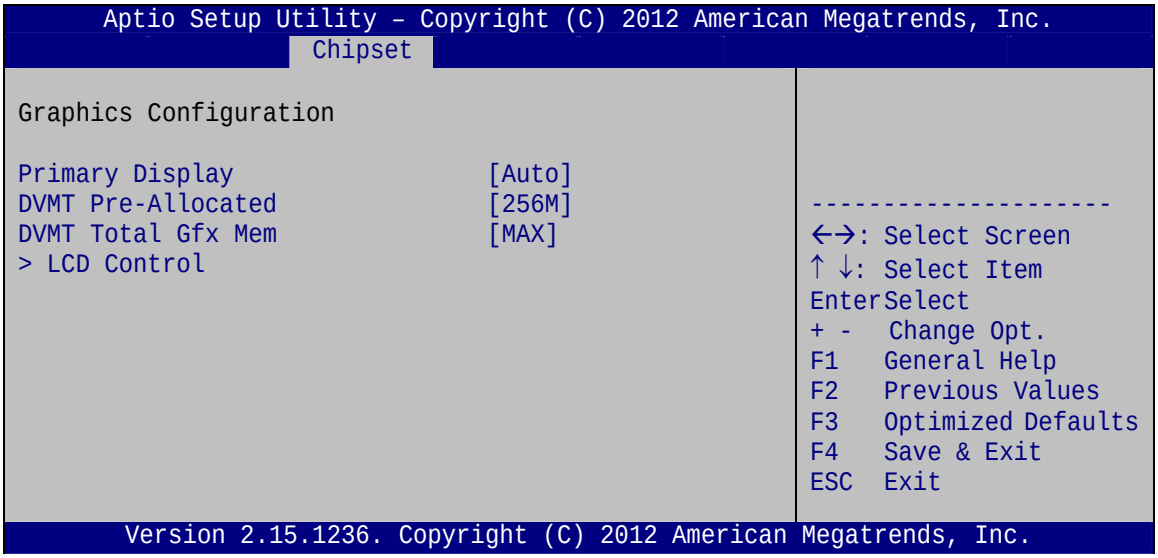
Use the **System Agent (SA) Configuration** menu (**BIOS Menu 22**) to configure the video device connected to the system.



BIOS Menu 22: System Agent (SA) Configuration

5.4.2.1 Graphics Configuration

Use the **Graphics Configuration** submenu (**BIOS Menu 23**) to configure the graphics settings.



BIOS Menu 23: Graphics Configuration

➔ **Primary Display [Auto]**

Use the **Primary Display** option to select the display device used by the system when it boots. Configuration options are listed below.

- Auto **DEFAULT**
- IGFX
- PEG
- PCIE/PCI

➔ **DVMT Pre-Allocated [256M]**

Use the **DVMT Pre-Allocated** option to specify the amount of system memory that can be used by the internal graphics device.

➔ **32M**		32 MB of memory used by internal graphics device
➔ **64M**		64 MB of memory used by internal graphics device
➔ **128M**		128 MB of memory used by internal graphics device
➔ **256M**	**DEFAULT**	256 MB of memory used by internal graphics device
➔ **512M**		512 MB of memory used by internal graphics device

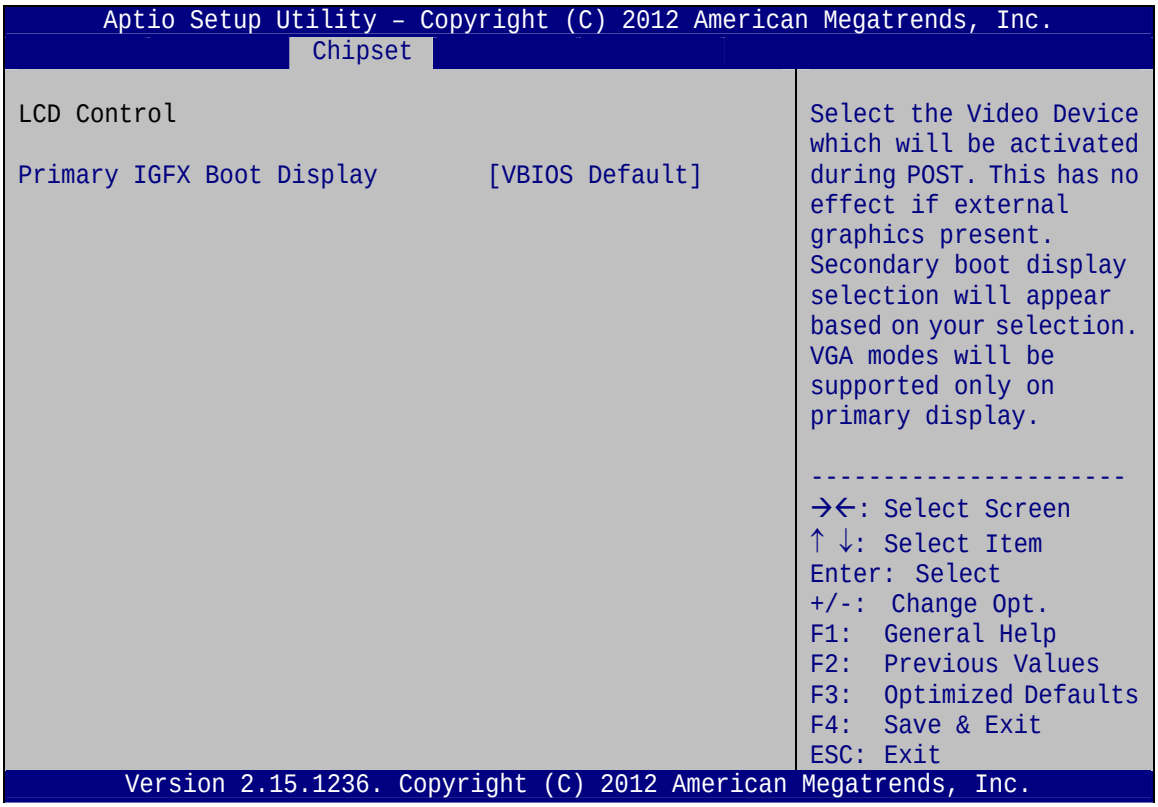
➔ **DVMT Total Gfx Mem [MAX]**

Use the **DVMT Total Gfx Mem** option to specify the maximum amount of memory that can be allocated as graphics memory. Configuration options are listed below.

- 128M
- 256M
- MAX **Default**

5.4.2.1.1 LCD Control

Use the **LCD Control** submenu (**BIOS Menu 24**) to select a display device which will be activated during POST.


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Chipset
LCD Control
Primary IGFX Boot Display [VBIOS Default]
Select the Video Device which will be activated during POST. This has no effect if external graphics present. Secondary boot display selection will appear based on your selection. VGA modes will be supported only on primary display.
→←: Select Screen
↑ ↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

BIOS Menu 24: LCD Control

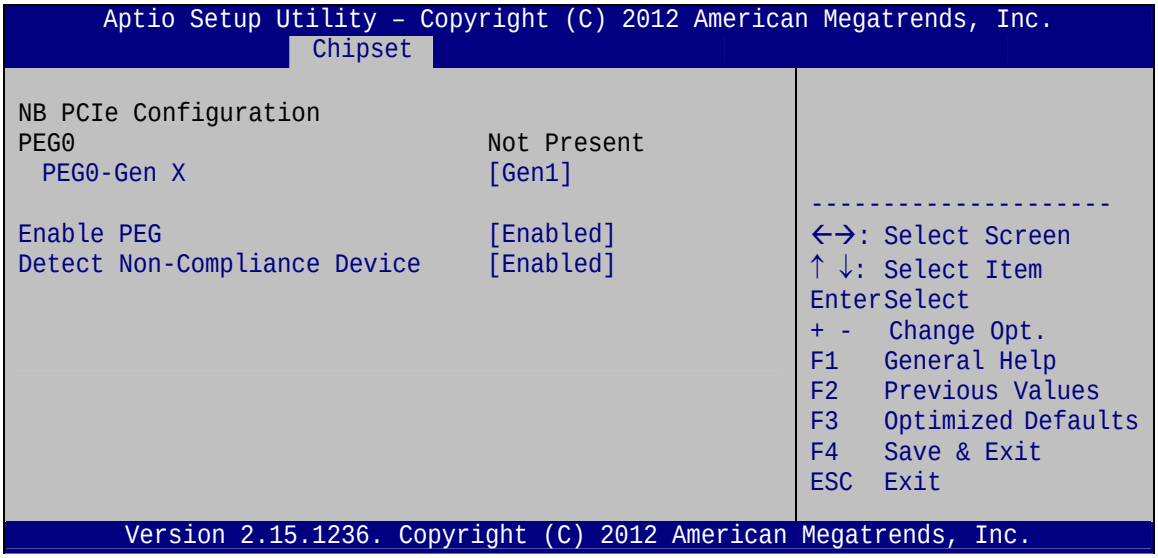
➔ **Primary IGFX Boot Display [VBIOS Default]**

Use the **Primary IGFX Boot Display** option to select the display device used by the system when it boots. Configuration options are listed below.

- VBIOS Default **DEFAULT**
- CRT
- DVI
- DP
- HDMI

5.4.2.2 NB PCIe Configuration

Use the **NB PCIe Configuration** submenu (**BIOS Menu 25**) to configure the northbridge PCIe settings.



BIOS Menu 25: NB PCIe Configuration

➔ **PEG0-Gen X [Gen1]**

Use the **PEG0-Gen X** option to configure PEG0 B0:D1:F0. Configuration options are listed below.

- Auto
- Gen1 **Default**
- Gen2
- Gen3

➔ **Enable PEG [Enabled]**

Use the **Enable PEG** option to enable or disable PEG.

➔ **Disabled**		Disables PEG.
➔ **Enabled**	**DEFAULT**	Enables PEG.
➔ **Auto**		Automatically detect PEG

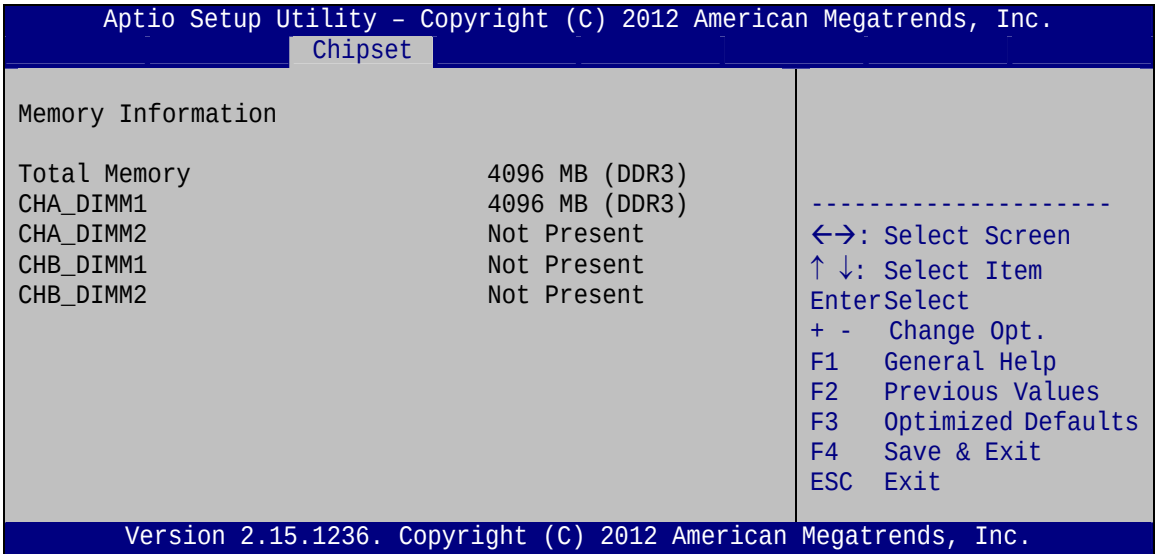
➔ **Detect Non-Compliance [Enabled]**

Use the **Detect Non-Compliance** option to detect non-compliance PCIe device in PEG.

➔ **Disabled**		Do not detect non-compliance PCIe device in PEG
➔ **Enabled**	**DEFAULT**	Detect non-compliance PCIe device in PEG

5.4.2.3 Memory Configuration

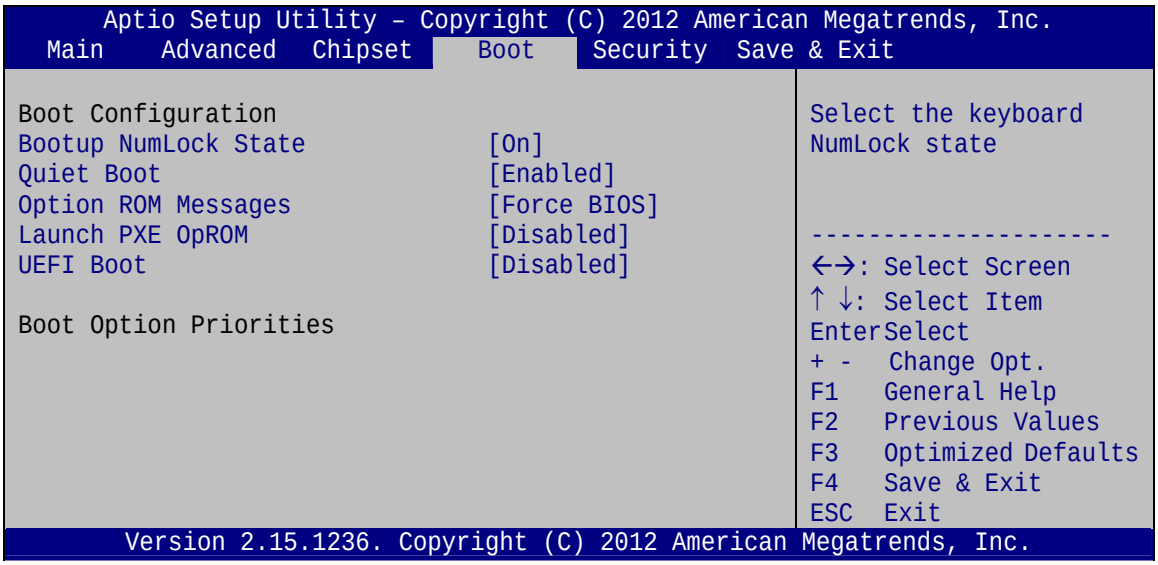
Use the **Memory Configuration** submenu (**BIOS Menu 26**) to configure the Memory settings.



BIOS Menu 26: Memory Configuration

5.5 Boot

Use the **Boot** menu (**BIOS Menu 27**) to configure system boot options.


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Boot Configuration
Bootup NumLock State [On]
Quiet Boot [Enabled]
Option ROM Messages [Force BIOS]
Launch PXE OpROM [Disabled]
UEFI Boot [Disabled]
Boot Option Priorities
Select the keyboard NumLock state
←→: Select Screen
↑ ↓: Select Item
Enter Select
+ - Change Opt.
F1 General Help
F2 Previous Values
F3 Optimized Defaults
F4 Save & Exit
ESC Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

BIOS Menu 27: Boot

➔ **Bootup NumLock State [On]**

Use the **Bootup NumLock State** BIOS option to specify if the number lock setting must be modified during boot up.

➔ **On** **DEFAULT** Allows the Number Lock on the keyboard to be enabled automatically when the computer system boots up. This allows the immediate use of the 10-key numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard is lit.

➔ **Off** Does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard lights up when the Number Lock is engaged.

➔ **Quiet Boot [Enabled]**

Use the **Quiet Boot** BIOS option to select the screen display when the system boots.

➔ **Disabled**		Normal POST messages displayed
➔ **Enabled**	**DEFAULT**	OEM Logo displayed instead of POST messages

➔ **Option ROM Messages [Force BIOS]**

Use the **Option ROM Messages** option to set the Option ROM display mode.

➔ **Force BIOS**	**DEFAULT**	Sets display mode to force BIOS.
➔ **Keep Current**		Sets display mode to current.

➔ **Launch PXE OpROM [Disabled]**

Use the **Launch PXE OpROM** option to enable or disable boot option for legacy network devices.

➔ **Disabled**	**DEFAULT**	Ignore all PXE Option ROMs
➔ **Enabled**		Load PXE Option ROMs

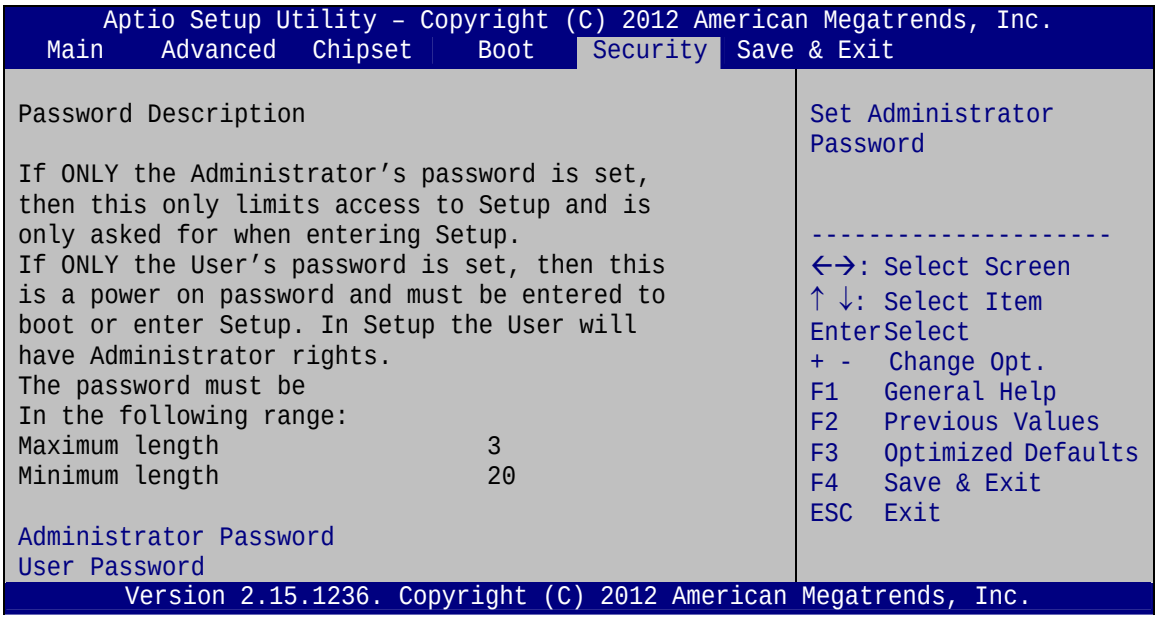
➔ **UEFI Boot [Disabled]**

Use the **UEFI Boot** option to enable or disable to boot from a UEFI device.

➔ **Disabled**	**DEFAULT**	Disable to boot from a UEFI device.
➔ **Enabled**		Enable to boot from a UEFI device.

5.6 Security

Use the **Security** menu (**BIOS Menu 28**) to set system and user passwords.


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Password Description
If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.
If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights.
The password must be
In the following range:
Maximum length 3
Minimum length 20
Administrator Password
User Password
Set Administrator Password
←→: Select Screen
↑ ↓: Select Item
Enter Select
+ - Change Opt.
F1 General Help
F2 Previous Values
F3 Optimized Defaults
F4 Save & Exit
ESC Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

BIOS Menu 28: Security

➔ **Administrator Password**

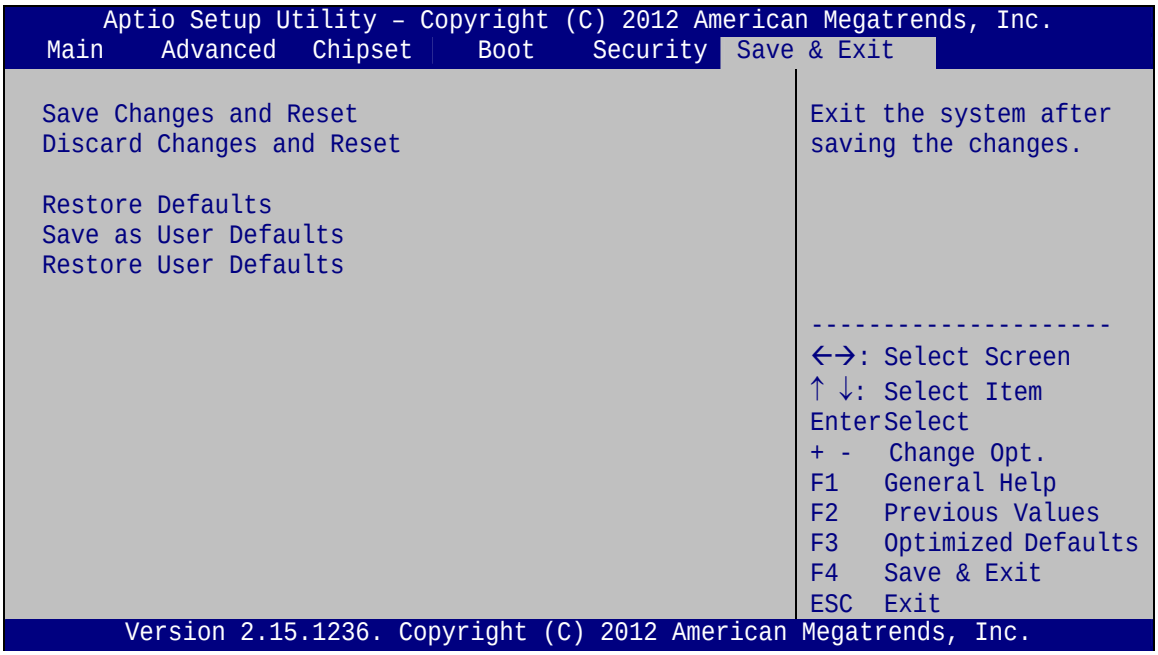
Use the **Administrator Password** to set or change a administrator password.

➔ **User Password**

Use the **User Password** to set or change a user password.

5.7 Exit

Use the **Exit** menu (**BIOS Menu 29**) to load default BIOS values, optimal failsafe values and to save configuration changes.


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Save Changes and Reset
Discard Changes and Reset
Restore Defaults
Save as User Defaults
Restore User Defaults
Exit the system after saving the changes.
←→: Select Screen
↑ ↓: Select Item
Enter Select
+ - Change Opt.
F1 General Help
F2 Previous Values
F3 Optimized Defaults
F4 Save & Exit
ESC Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

BIOS Menu 29:Exit

➔ **Save Changes and Reset**

Use the **Save Changes and Reset** option to save the changes made to the BIOS options and reset the system.

➔ **Discard Changes and Reset**

Use the **Discard Changes and Reset** option to exit the system without saving the changes made to the BIOS configuration setup program.

➔ **Restore Defaults**

Use the **Restore Defaults** option to load the optimal default values for each of the parameters on the Setup menus. **F3 key can be used for this operation.**

➔ **Save as User Defaults**

Use the **Save as User Defaults** option to save the changes done so far as user defaults.

➔ **Restore User Defaults**

Use the **Restore User Defaults** option to restore the user defaults to all the setup options.

Chapter

6

Software Drivers

6.1 Available Software Drivers

NOTE:

The content of the CD may vary throughout the life cycle of the product and is subject to change without prior notice. Visit the IEI website or contact technical support for the latest updates.

The following drivers can be installed on the system:

- Chipset
- Graphics
- LAN
- USB 3.0
- Audio
- Intel® AMT

Installation instructions are given below.

6.2 Software Installation

All the drivers for the IMBA-Q870-i2 are on the CD that came with the system. To install the drivers, please follow the steps below.

Step 1: Insert the CD into a CD drive connected to the system.

NOTE:

If the installation program doesn't start automatically:
Click "Start->My Computer->CD Drive->autorun.exe"

Step 2: The driver main menu appears (**Figure 6-1**).

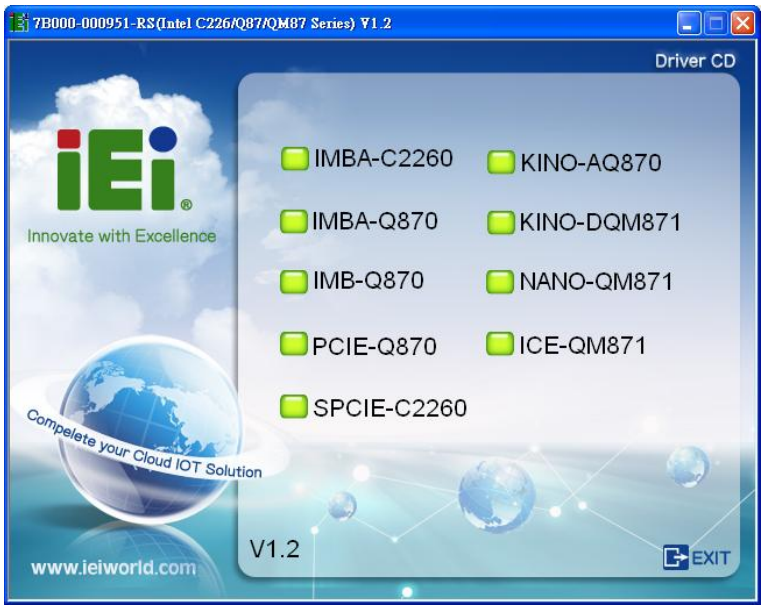


Figure 6-1: Introduction Screen

Step 3: Click IMBA-Q870.

Step 4: A new screen with a list of available drivers appears (**Figure 6-2**).

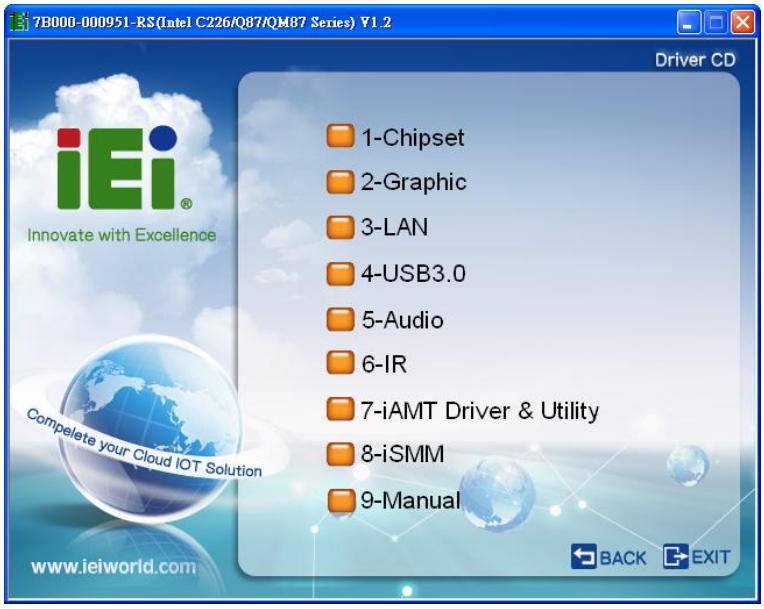


Figure 6-2: Available Drivers

Step 5: Install all of the necessary drivers in this menu.

6.3 Chipset Driver Installation

To install the chipset driver, please do the following.

Step 1: Access the driver list. (See **Section 6.2**)

Step 2: Click "**1-Chipset**".

Step 3: Locate the setup file and double click on it.

Step 4: When the setup files are completely extracted, the **Welcome Screen** in **Figure 6-3** appears.

Step 5: Click **Next** to continue.

Intel® Chipset Device Software
Intel® Chipset Device Software
intel
Welcome to the Setup Program
This setup program will install the Intel® Chipset Device Software onto this computer. It is strongly recommended that you exit all programs before continuing.
< Back
Next >
Cancel
Intel® Installation Framework

Figure 6-3: Chipset Driver Welcome Screen

Step 6: The license agreement in **Figure 6-4** appears.

Step 7: Read the **License Agreement**.

Step 8: Click **Yes** to continue.

Intel® Chipset Device Software
Intel® Chipset Device Software
License Agreement
You must accept all of the terms of the license agreement in order to continue the setup program. Do you accept the terms?
INTEL SOFTWARE LICENSE AGREEMENT (OEM / IHV / ISV Distribution & Single User)
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
Please Also Note:
* If you are an Original Equipment Manufacturer (OEM), Independent Hardware Vendor (IHV), or Independent Software Vendor (ISV), this complete LICENSE AGREEMENT applies;
< Back
Yes
No
Intel® Installation Framework

Figure 6-4: Chipset Driver License Agreement

Step 9: The **Read Me** file in **Figure 6-5** appears.

Step 10: Click **Next** to continue.

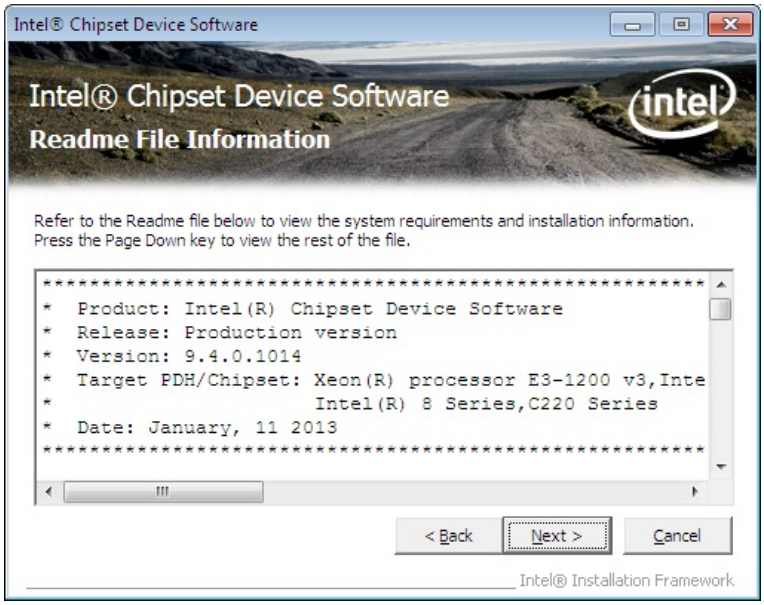

Intel® Chipset Device Software
Intel® Chipset Device Software
Readme File Information
Refer to the Readme file below to view the system requirements and installation information.
Press the Page Down key to view the rest of the file.
* Product: Intel(R) Chipset Device Software
* Release: Production version
* Version: 9.4.0.1014
* Target PDH/Chipset: Xeon(R) processor E3-1200 v3,Inte
* Intel(R) 8 Series,C220 Series
* Date: January, 11 2013
< Back
Next >
Cancel
Intel® Installation Framework

Figure 6-5: Chipset Driver Read Me File

Step 11: **Setup Operations** are performed as shown in **Figure 6-6**.

Step 12: Once the **Setup Operations** are complete, click **Next** to continue.

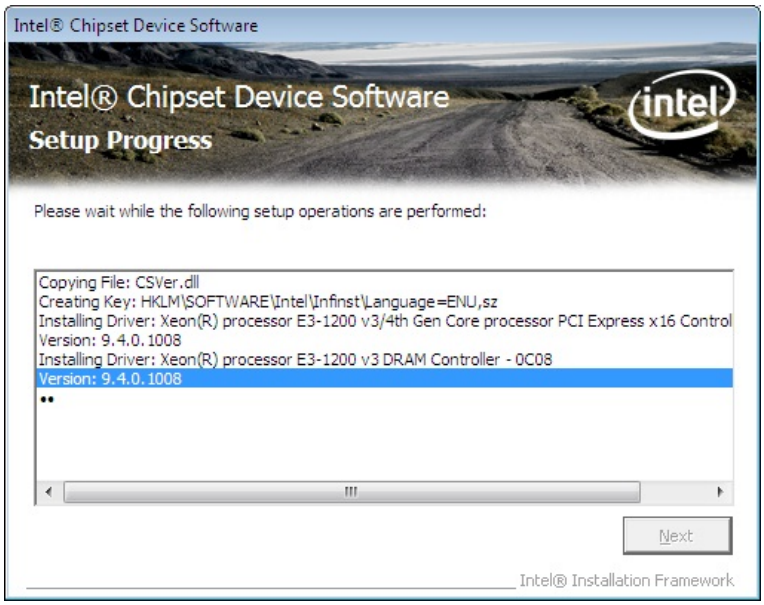

Intel® Chipset Device Software
Intel® Chipset Device Software
Setup Progress
Please wait while the following setup operations are performed:
Copying File: CSVer.dll
Creating Key: HKLM\SOFTWARE\Intel\Infinst\Language=ENU,sz
Installing Driver: Xeon(R) processor E3-1200 v3/4th Gen Core processor PCI Express x16 Control
Version: 9.4.0.1008
Installing Driver: Xeon(R) processor E3-1200 v3 DRAM Controller - 0C08
Version: 9.4.0.1008
Next
Intel® Installation Framework

Figure 6-6: Chipset Driver Setup Operations

Step 13: The **Finish** screen in **Figure 6-7** appears.

Step 14: Select "**Yes, I want to restart this computer now**" and click **Finish**.

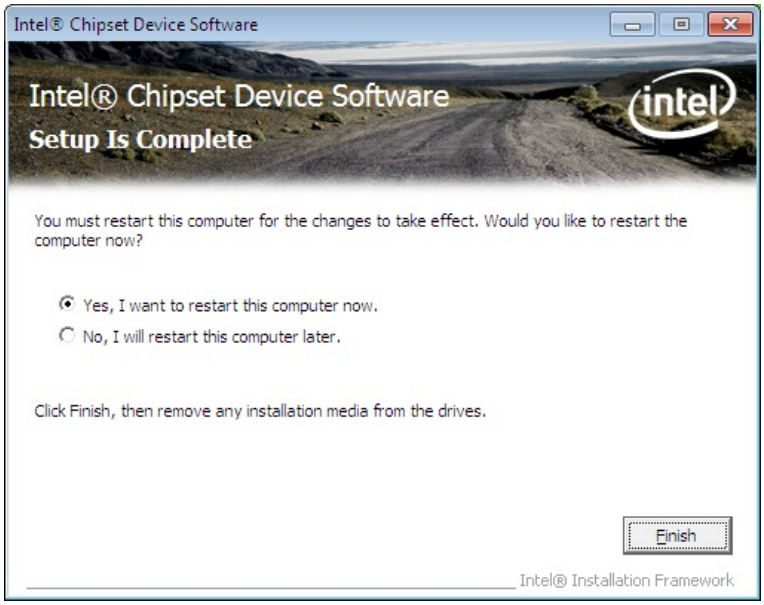

Intel® Chipset Device Software
Intel® Chipset Device Software
Setup Is Complete
You must restart this computer for the changes to take effect. Would you like to restart the computer now?
Yes, I want to restart this computer now.
No, I will restart this computer later.
Click Finish, then remove any installation media from the drives.
Finish
Intel® Installation Framework

Figure 6-7: Chipset Driver Installation Finish Screen

6.4 Graphics Driver Installation

To install the Graphics driver, please do the following.

Step 1: Access the driver list. (See **Section 6.2**)

Step 2: Click "**2-Graphics**" and select the folder which corresponds to the operating system.

Step 3: Locate the setup file and double click on it.

Step 4: The **Welcome Screen** in **Figure 6-8** appears.

Step 5: Click **Next** to continue.

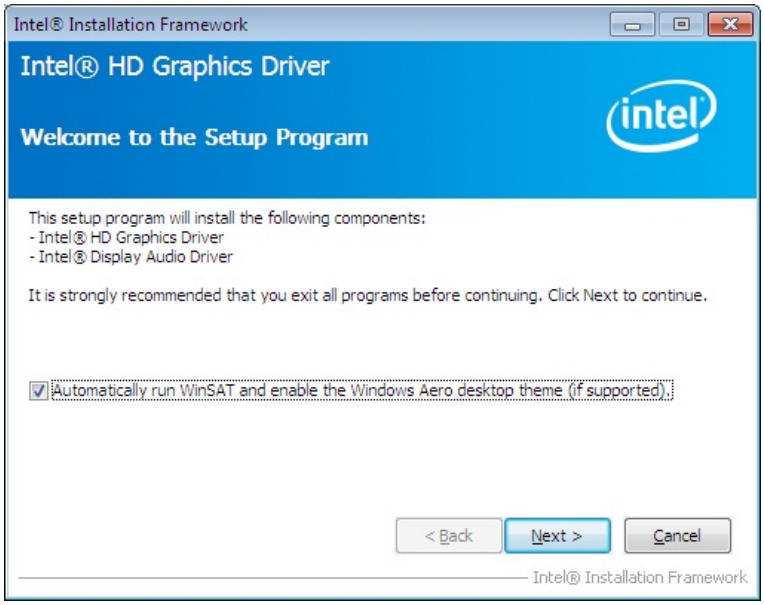

Intel® Installation Framework
Intel® HD Graphics Driver
Welcome to the Setup Program
intel
This setup program will install the following components:
- Intel® HD Graphics Driver
- Intel® Display Audio Driver
It is strongly recommended that you exit all programs before continuing. Click Next to continue.
Automatically run WinSAT and enable the Windows Aero desktop theme (if supported).
< Back
Next >
Cancel
Intel® Installation Framework

Figure 6-8: Graphics Driver Welcome Screen

Step 6: The **License Agreement** in **Figure 6-9** appears.

Step 7: Click **Yes** to accept the agreement and continue.

Intel® Installation Framework
Intel® HD Graphics Driver
License Agreement
intel
You must accept all of the terms of the license agreement in order to continue the setup program. Do you accept the terms?
INTEL SOFTWARE LICENSE AGREEMENT (Alpha / Beta, Organizational Use)
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
The Software contains pre-release "alpha" or "beta" code, which may not be fully functional and which Intel Corporation ("Intel") may substantially modify in producing any "final" version of the Software. Intel can provide no assurance that it will ever produce or make generally
< Back
Yes
No
Intel® Installation Framework

Figure 6-9: Graphics Driver License Agreement

Step 8: The **Read Me** file in **Figure 6-10** appears. Click **Next** to continue.

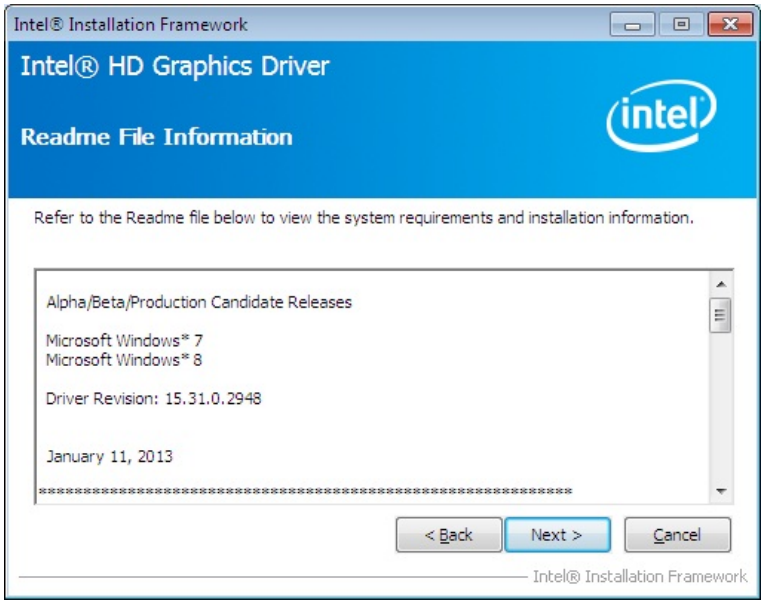


Figure 6-10: Graphics Driver Read Me File

Step 9: **Setup Operations** are performed as shown in **Figure 6-11**.

Step 10: Once the **Setup Operations** are complete, click **Next** to continue.

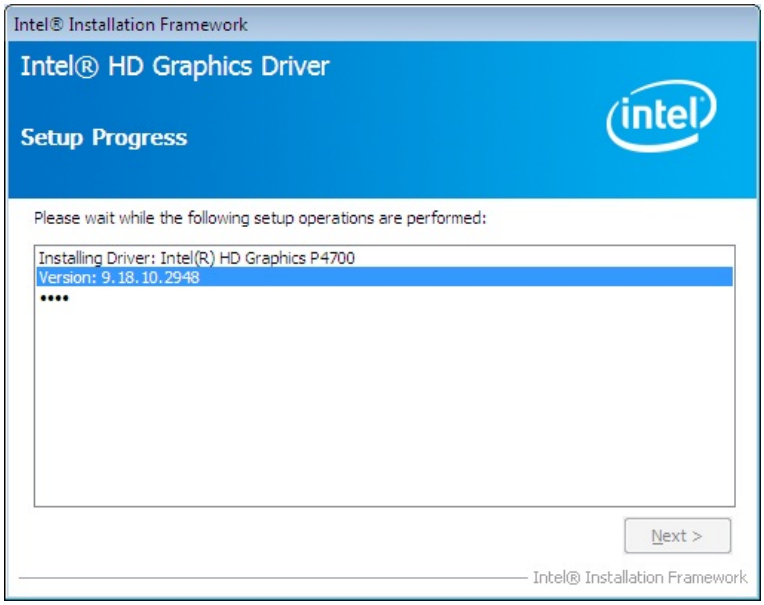


Figure 6-11: Graphics Driver Setup Operations

Step 11: The **Finish** screen in **Figure 6-12** appears.

Step 12: Select "**Yes, I want to restart this computer now**" and click **Finish**.

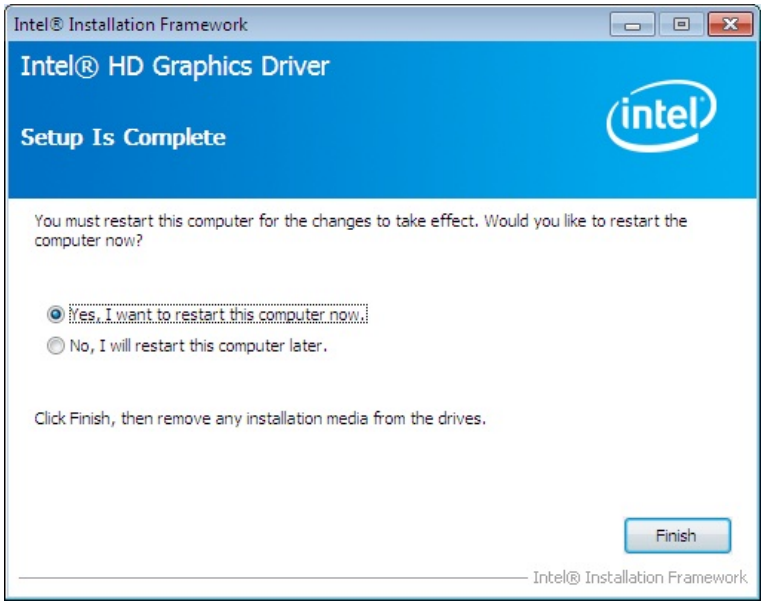

Intel® Installation Framework
Intel® HD Graphics Driver
Setup Is Complete
You must restart this computer for the changes to take effect. Would you like to restart the computer now?
Yes, I want to restart this computer now.
No, I will restart this computer later.
Click Finish, then remove any installation media from the drives.
Finish
Intel® Installation Framework

Figure 6-12: Graphics Driver Installation Finish Screen

6.5 LAN Driver Installation

To install the LAN driver, please do the following.

Step 1: Right-click the Computer button from the start menu and select **Properties**. (**Figure 6-13**).

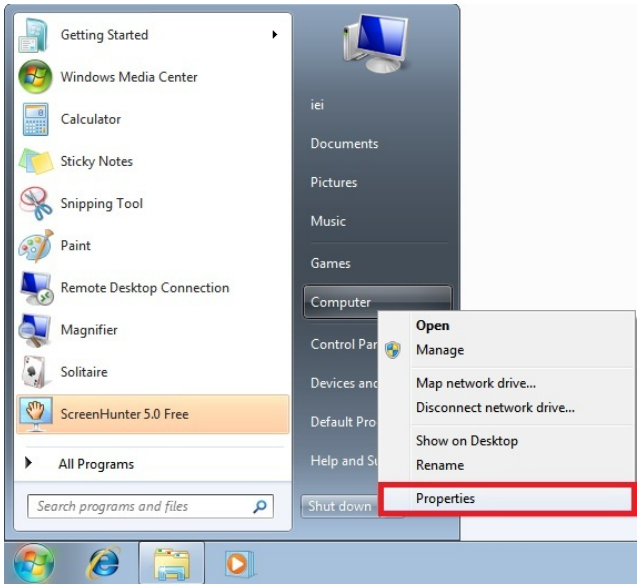


Figure 6-13: Windows Control Panel

Step 2: The system control panel window in **Figure 6-14** appears.

Step 3: Click the Device Manager link (**Figure 6-14**).

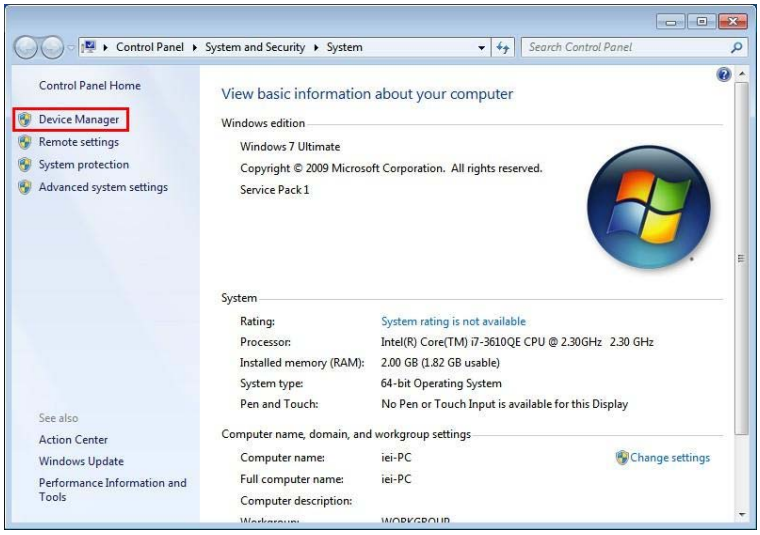


Figure 6-14: System Control Panel

Step 4: A list of system hardware devices appears (**Figure 6-15**).

Step 5: Right-click one of the Ethernet controllers that has question marks next to it (this means Windows does not recognize the device).

Step 6: Select **Update Driver Software**. See **Figure 6-15**.

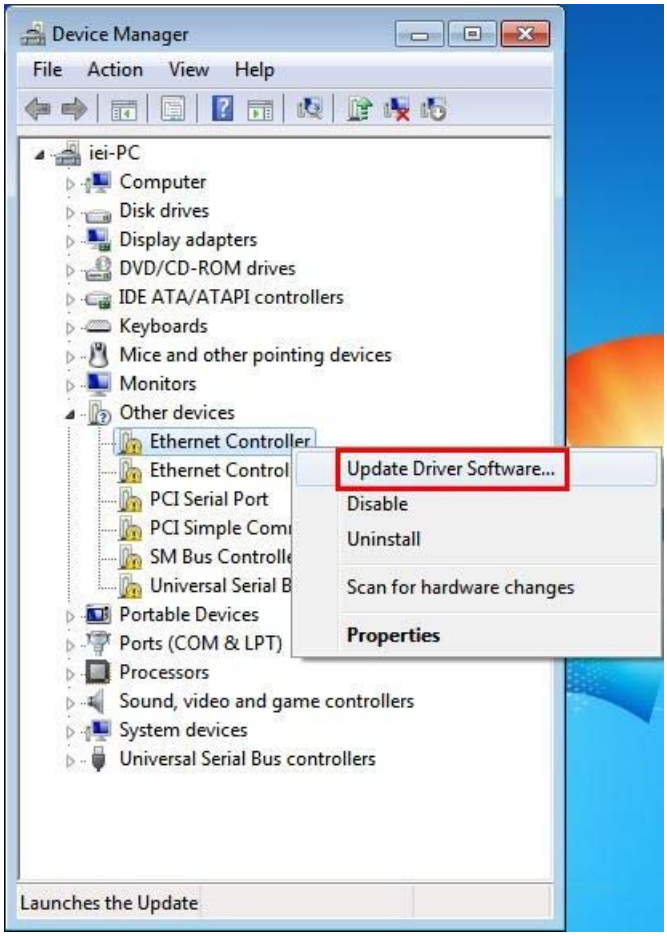


Figure 6-15: Device Manager List

Step 7: The Update Driver Software Window appears (**Figure 6-16**).

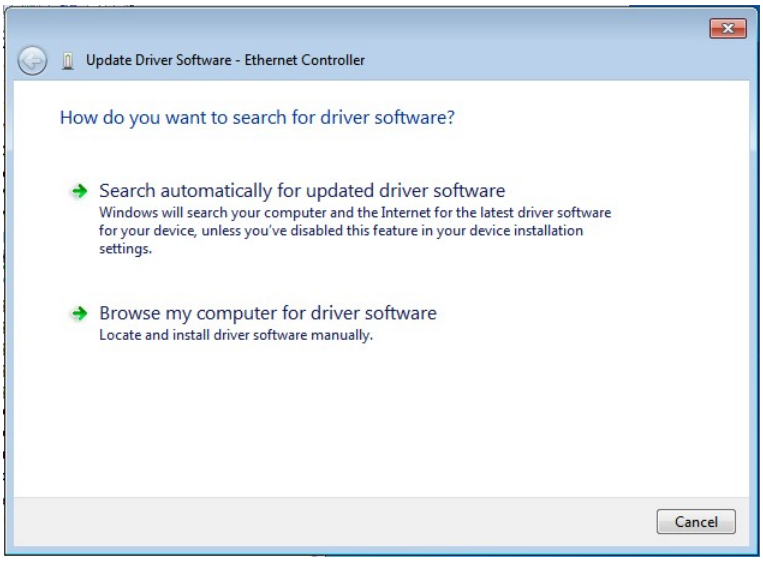

Update Driver Software - Ethernet Controller
How do you want to search for driver software?
Search automatically for updated driver software
Windows will search your computer and the Internet for the latest driver software for your device, unless you've disabled this feature in your device installation settings.
Browse my computer for driver software
Locate and install driver software manually.
Cancel

Figure 6-16: Update Driver Software Window

Step 8: Select "Browse my computer for driver software" and click **NEXT** to continue.

Step 9: Click Browse to select "**X:\3-LAN**" directory in the **Locate File** window, where "**X:\"** is the system CD drive. (**Figure 6-17**).

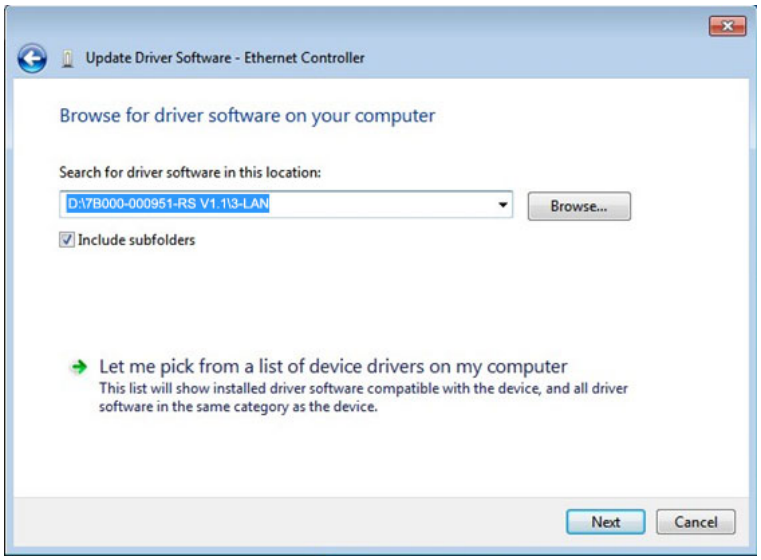

Update Driver Software - Ethernet Controller
Browse for driver software on your computer
Search for driver software in this location:
D:\7B000-000951-RS V1.1\3-LAN
Browse...
Include subfolders
Let me pick from a list of device drivers on my computer
This list will show installed driver software compatible with the device, and all driver software in the same category as the device.
Next
Cancel

Figure 6-17: Locate Driver Files

Step 10: Click **NEXT** to continue.

Step 11: Driver Installation is performed as shown in **Figure 6-18**.

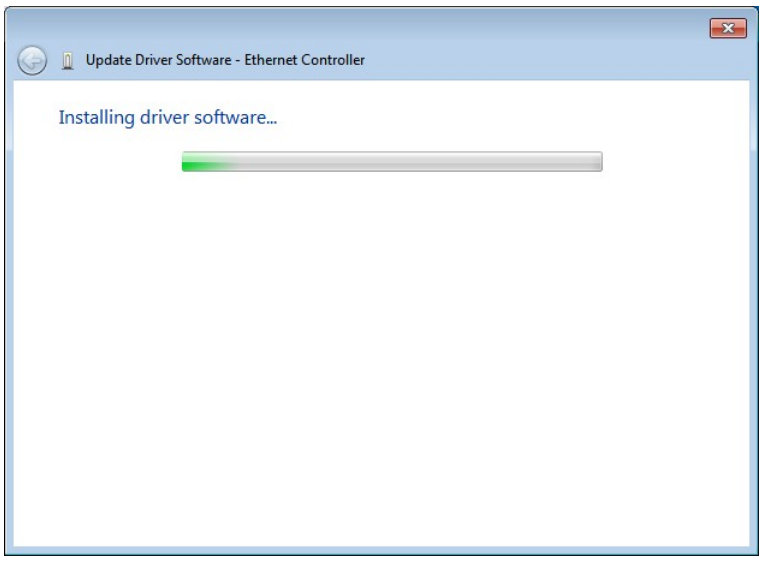


Figure 6-18: LAN Driver Installation

Step 12: The **Finish** screen appears. Click **Close** to exit.

Step 13: Right-click the other Ethernet controller that has question marks next to it as shown in **Figure 6-15**. Repeat **Step 6** ~ **Step 12** to install the second Ethernet controller driver.

6.6 USB 3.0 Driver Installation

WARNING:

Do not run this driver's installer (Setup.exe) from a USB storage device (ie. external USB hard drive or USB thumb drive). For proper installation, please copy driver files to a local hard drive folder and run from there.

To install the USB 3.0 driver, please follow the steps below.

Step 1: Access the driver list. (See **Section 6.2**)

Step 2: Click "**4-USB 3.0**".

Step 3: Locate the setup file and double click on it.

Step 4: A **Welcome Screen** appears (**Figure 6-19**).

Step 5: Click **Next** to continue.

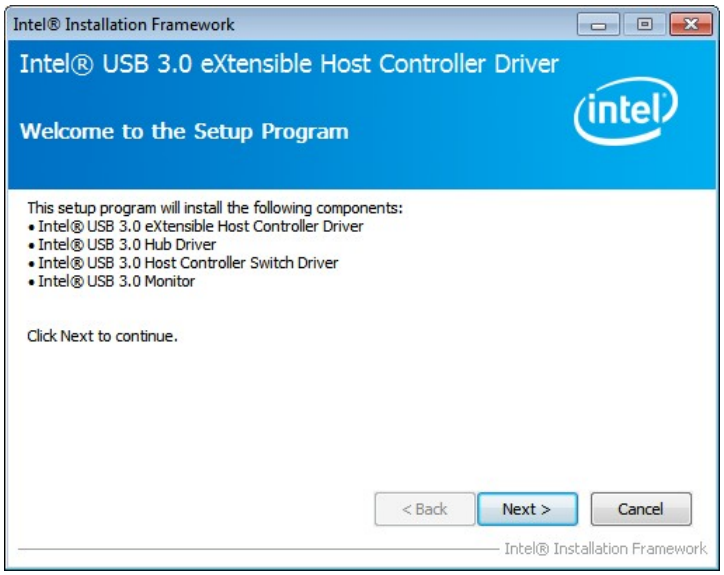

Intel® Installation Framework
Intel® USB 3.0 eXtensible Host Controller Driver
Welcome to the Setup Program
intel
This setup program will install the following components:
• Intel® USB 3.0 eXtensible Host Controller Driver
• Intel® USB 3.0 Hub Driver
• Intel® USB 3.0 Host Controller Switch Driver
• Intel® USB 3.0 Monitor
Click Next to continue.
< Back
Next >
Cancel
Intel® Installation Framework

Figure 6-19: USB 3.0 Driver Welcome Screen

Step 6: The license agreement in **Figure 6-20** appears.

Step 7: Read the **License Agreement**.

Step 8: Click **Yes** to continue.

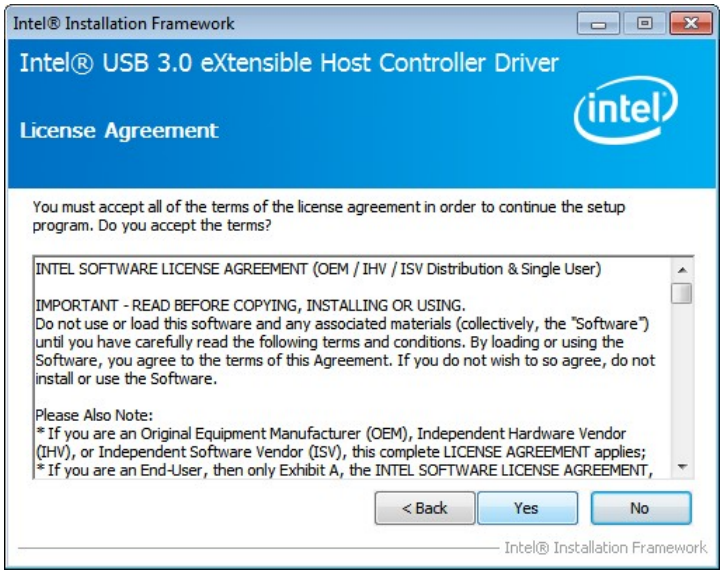

Intel® Installation Framework
Intel® USB 3.0 eXtensible Host Controller Driver
License Agreement
You must accept all of the terms of the license agreement in order to continue the setup program. Do you accept the terms?
INTEL SOFTWARE LICENSE AGREEMENT (OEM / IHV / ISV Distribution & Single User)
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
Please Also Note:
* If you are an Original Equipment Manufacturer (OEM), Independent Hardware Vendor (IHV), or Independent Software Vendor (ISV), this complete LICENSE AGREEMENT applies;
* If you are an End-User, then only Exhibit A, the INTEL SOFTWARE LICENSE AGREEMENT,
< Back
Yes
No
Intel® Installation Framework

Figure 6-20: USB 3.0 Driver License Agreement

Step 9: The **Read Me** file in **Figure 6-21** appears.

Step 10: Click **Next** to continue.

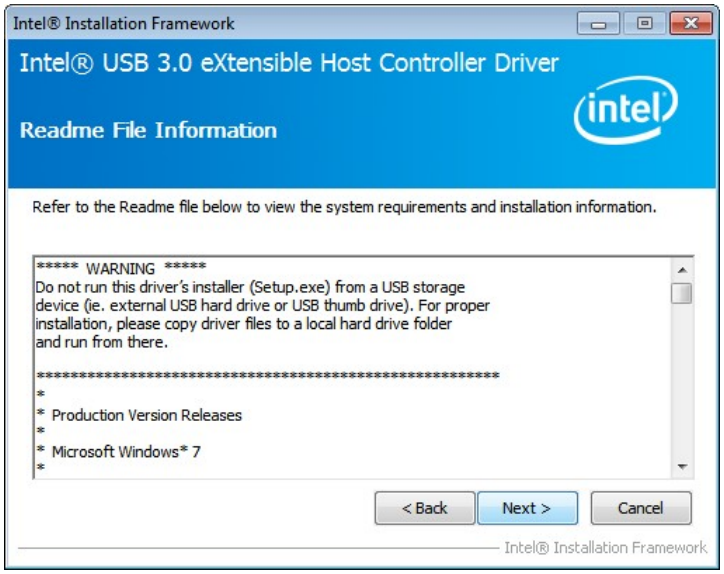

Intel® Installation Framework
Intel® USB 3.0 eXtensible Host Controller Driver
Readme File Information
Refer to the Readme file below to view the system requirements and installation information.
***** WARNING *****
Do not run this driver's installer (Setup.exe) from a USB storage device (ie. external USB hard drive or USB thumb drive). For proper installation, please copy driver files to a local hard drive folder and run from there.
****
*
* Production Version Releases
*
* Microsoft Windows* 7
*
< Back
Next >
Cancel
Intel® Installation Framework

Figure 6-21: USB 3.0 Driver Read Me File

Step 11: **Setup Operations** are performed as shown in **Figure 6-22**.

Step 12: Once the **Setup Operations** are complete, click **Next** to continue.

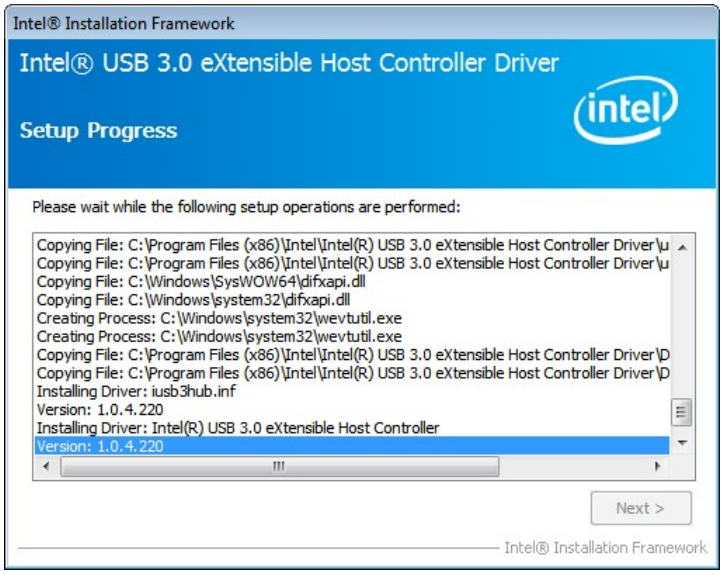

Intel® Installation Framework
Intel® USB 3.0 eXtensible Host Controller Driver
Setup Progress
Please wait while the following setup operations are performed:
Copying File: C:\Program Files (x86)\Intel\Intel(R) USB 3.0 eXtensible Host Controller Driver\u
Copying File: C:\Program Files (x86)\Intel\Intel(R) USB 3.0 eXtensible Host Controller Driver\u
Copying File: C:\Windows\SysWOW64\difxapi.dll
Copying File: C:\Windows\system32\difxapi.dll
Creating Process: C:\Windows\system32\wevtutil.exe
Creating Process: C:\Windows\system32\wevtutil.exe
Copying File: C:\Program Files (x86)\Intel\Intel(R) USB 3.0 eXtensible Host Controller Driver\D
Copying File: C:\Program Files (x86)\Intel\Intel(R) USB 3.0 eXtensible Host Controller Driver\D
Installing Driver: iusb3hub.inf
Version: 1.0.4.220
Installing Driver: Intel(R) USB 3.0 eXtensible Host Controller
Version: 1.0.4.220
Next >
Intel® Installation Framework

Figure 6-22: USB 3.0 Driver Setup Operations

Step 13: The **Finish** screen in **Figure 6-23** appears.

Step 14: Select "**Yes, I want to restart this computer now**" and click **Finish**.

Intel® Installation Framework
Intel® USB 3.0 eXtensible Host Controller Driver
Setup Is Complete
You must restart this computer for the changes to take effect. Would you like to restart the computer now?
Yes, I want to restart this computer now.
No, I will restart this computer later.
Click Finish, then remove any installation media from the drives.
Finish
Intel® Installation Framework

Figure 6-23: USB 3.0 Driver Installation Finish Screen

6.7 Audio Driver Installation

To install the Realtek High Definition (HD) Audio driver, please follow the steps below.

6.7.1 BIOS Setup

Step 1: Enter the BIOS setup. To do this, reboot the system and press **DEL** during POST.

Step 2: Go to the PCH Azalia Configuration submenu. Enable the **Azalia** option. Refer to **Section 5.4.1.2**.

Step 3: Press **F10** to save the changes and exit the BIOS setup. The system reboots.

6.7.2 Driver Installation

To install the audio driver please follow the steps below. To install the audio driver, please do the following.

Step 1: Access the driver list. (See **Section 6.2**)

Step 2: Click "**5-Audio**" and select the folder which corresponds to the operating system.

Step 3: Double click the setup file.

Step 4: The **InstallShield Wizard** is prepared to guide the user through the rest of the process.

Step 5: Once initialized, the **InstallShield Wizard** welcome screen appears (**Figure 6-24**).

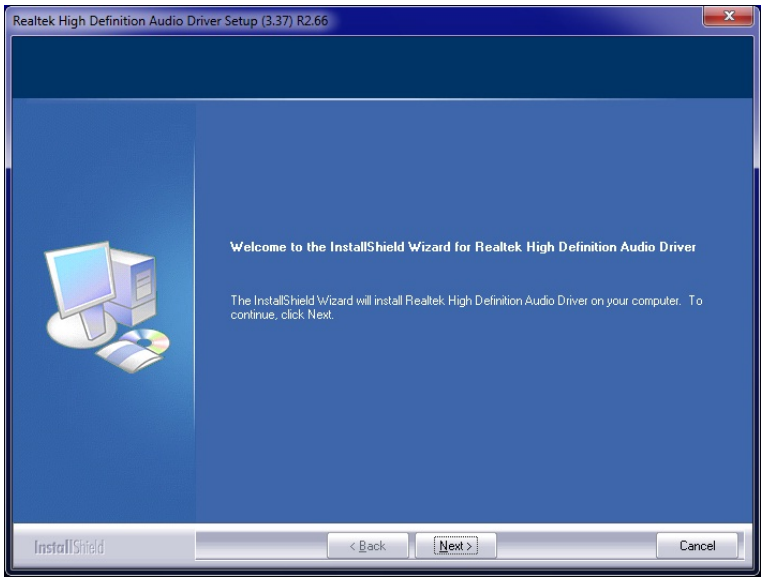

Realtek High Definition Audio Driver Setup (3.37) R2.66
Welcome to the InstallShield Wizard for Realtek High Definition Audio Driver
The InstallShield Wizard will install Realtek High Definition Audio Driver on your computer. To continue, click Next.
InstallShield
< Back
Next >
Cancel

Figure 6-24: InstallShield Wizard Welcome Screen

Step 6: Click **Next** to continue the installation.

Step 7: InstallShield starts to install the new software as shown in **Figure 6-25**.

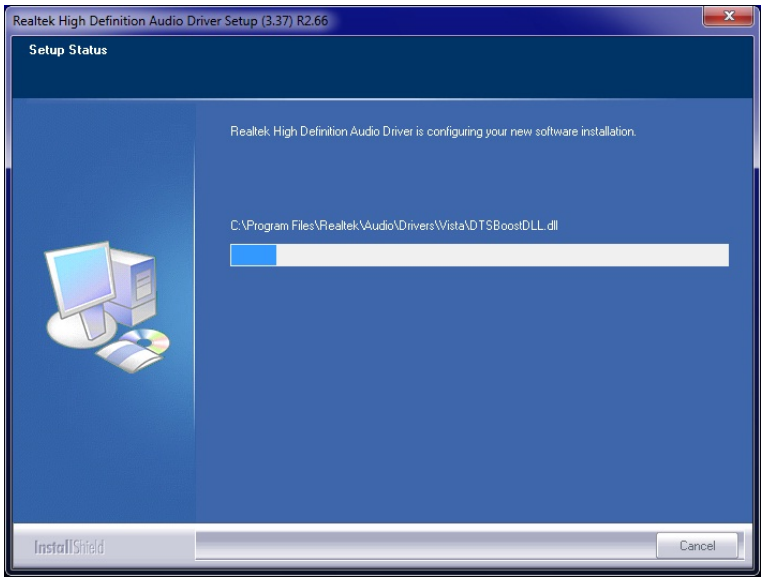

Realtek High Definition Audio Driver Setup (3.37) R2.66
Setup Status
Realtek High Definition Audio Driver is configuring your new software installation.
C:\Program Files\Realtek\Audio\Drivers\Vista\DTSBoostDLL.dll
InstallShield
Cancel

Figure 6-25: Audio Driver Software Configuration

Step 8: After the driver installation process is complete, a confirmation screen appears (**Figure 6-26**).

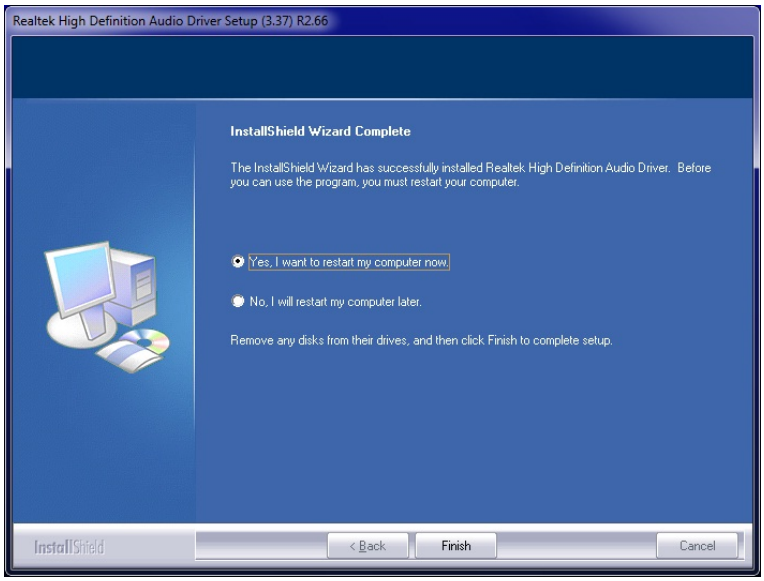

Realtek High Definition Audio Driver Setup (3.37) R2.66
InstallShield Wizard Complete
The InstallShield Wizard has successfully installed Realtek High Definition Audio Driver. Before you can use the program, you must restart your computer.
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish to complete setup.
InstallShield
< Back
Finish
Cancel

Figure 6-26: Restart the Computer

Step 1: The confirmation screen offers the option of restarting the computer now or later. For the settings to take effect, the computer must be restarted. Click **Finish** to restart the computer.

6.8 Intel® AMT Driver Installation

The package of the Intel® ME components includes

- Intel® Management Engine Interface (Intel® ME Interface)
- Intel® Dynamic Application Loader
- Intel® Identity Protection Technology (Intel® IPT)
- Serial Over LAN (SOL) driver
- Intel® Management and Security Status Application
- Local Manageability Service (LMS)

To install these Intel® ME components, please do the following.

Step 1: Access the driver list. (See **Section 6.2**)

Step 2: Click "**7-iAMT Driver & Utility**".

Step 3: Double click the setup file in the **ME_SW** folder.

Step 4: Locate the setup file and double click it.

Step 5: When the setup files are completely extracted the **Welcome Screen** in **Figure 6-27** appears.

Step 6: Click **Next** to continue.

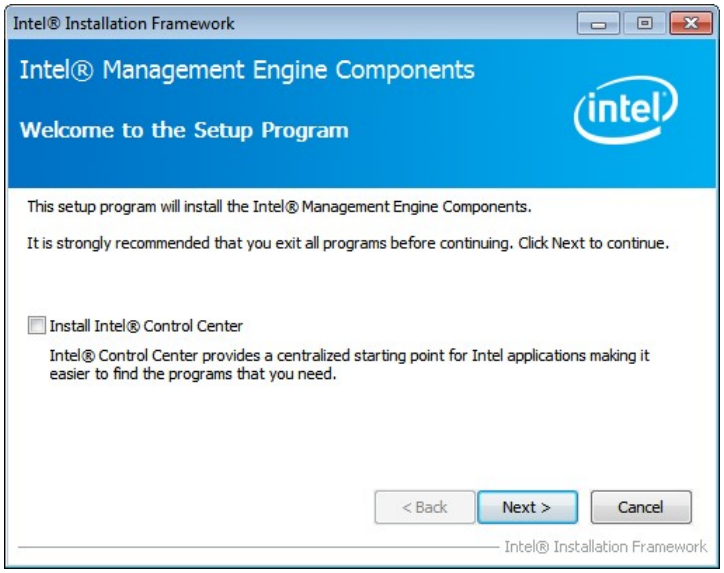

Intel® Installation Framework
Intel® Management Engine Components
Welcome to the Setup Program
intel
This setup program will install the Intel® Management Engine Components.
It is strongly recommended that you exit all programs before continuing. Click Next to continue.
Install Intel® Control Center
Intel® Control Center provides a centralized starting point for Intel applications making it easier to find the programs that you need.
< Back
Next >
Cancel
Intel® Installation Framework

Figure 6-27: Intel® ME Driver Welcome Screen

Step 7: The license agreement in Figure 6-28 appears.

Step 8: Read the **License Agreement**.

Step 9: Click **Yes** to continue.

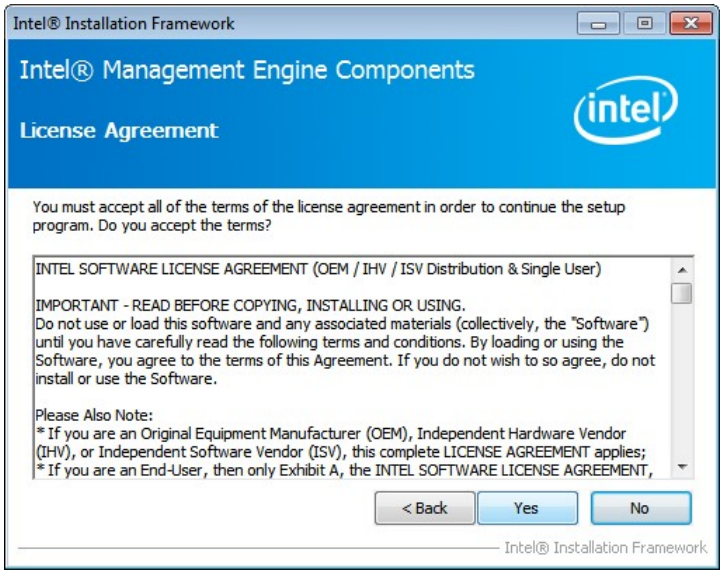

Intel® Installation Framework
Intel® Management Engine Components
License Agreement
You must accept all of the terms of the license agreement in order to continue the setup program. Do you accept the terms?
INTEL SOFTWARE LICENSE AGREEMENT (OEM / IHV / ISV Distribution & Single User)
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
Please Also Note:
* If you are an Original Equipment Manufacturer (OEM), Independent Hardware Vendor (IHV), or Independent Software Vendor (ISV), this complete LICENSE AGREEMENT applies;
* If you are an End-User, then only Exhibit A, the INTEL SOFTWARE LICENSE AGREEMENT,
< Back
Yes
No
Intel® Installation Framework

Figure 6-28: Intel® ME Driver License Agreement

Step 10: **Setup Operations** are performed as shown in Figure 6-29.

Step 11: Once the **Setup Operations** are complete, click **Next** to continue.

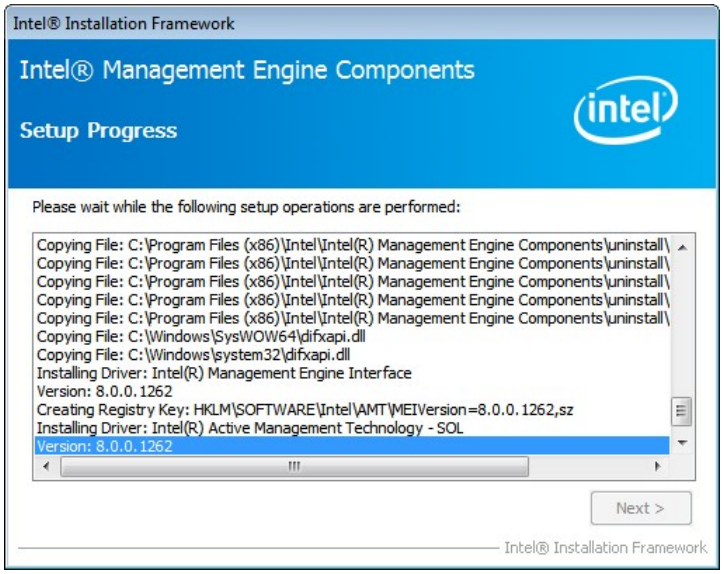

Intel® Installation Framework
Intel® Management Engine Components
Setup Progress
Please wait while the following setup operations are performed:
Copying File: C:\Program Files (x86)\Intel\Intel(R) Management Engine Components\uninstall\
Copying File: C:\Program Files (x86)\Intel\Intel(R) Management Engine Components\uninstall\
Copying File: C:\Program Files (x86)\Intel\Intel(R) Management Engine Components\uninstall\
Copying File: C:\Program Files (x86)\Intel\Intel(R) Management Engine Components\uninstall\
Copying File: C:\Program Files (x86)\Intel\Intel(R) Management Engine Components\uninstall\
Copying File: C:\Windows\SysWOW64\difxapi.dll
Copying File: C:\Windows\system32\difxapi.dll
Installing Driver: Intel(R) Management Engine Interface
Version: 8.0.0.1262
Creating Registry Key: HKLM\SOFTWARE\Intel\AMT\MEIVersion=8.0.0.1262,sz
Installing Driver: Intel(R) Active Management Technology - SOL
Version: 8.0.0.1262
Next >
Intel® Installation Framework

Figure 6-29: Intel® ME Driver Setup Operations

Step 12: The **Finish** screen in Figure 6-30 appears.

Step 13: Select "**Yes, I want to restart this computer now**" and click **Finish**.

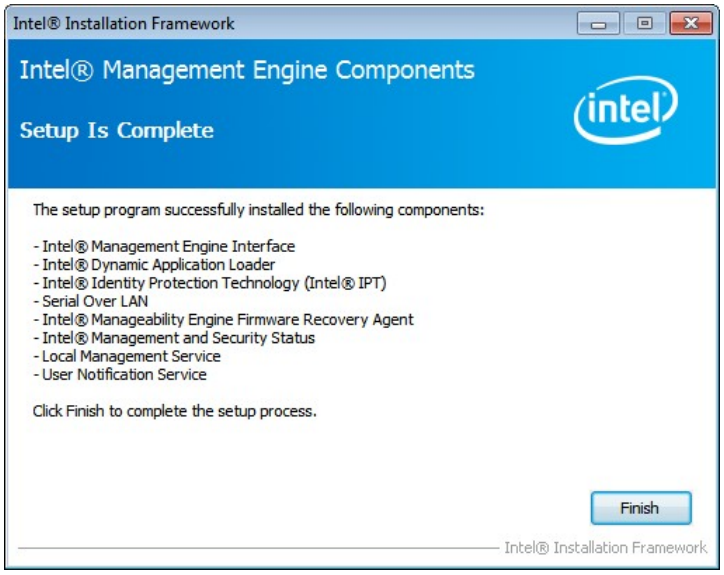

Intel® Installation Framework
Intel® Management Engine Components
Setup Is Complete
intel
The setup program successfully installed the following components:
- Intel® Management Engine Interface
- Intel® Dynamic Application Loader
- Intel® Identity Protection Technology (Intel® IPT)
- Serial Over LAN
- Intel® Manageability Engine Firmware Recovery Agent
- Intel® Management and Security Status
- Local Management Service
- User Notification Service
Click Finish to complete the setup process.
Finish
Intel® Installation Framework

Figure 6-30: Intel® ME Driver Installation Finish Screen

Appendix

A

BIOS Options

Below is a list of BIOS configuration options in the BIOS chapter.

System Date [xx/xx/xx] 89
System Time [xx:xx:xx] 89
ACPI Sleep State [S1 (CPU Stop Clock)] 90
Wake System with Fixed Time [Disabled] 91
Security Device Support [Disable] 93
Hyper-threading [Enabled] 94
Active Processor Cores [All] 94
Intel Virtualization Technology [Disabled] 95
EIST [Enabled] 95
SATA Controller(s) [Enabled] 96
SATA Mode Selection [IDE] 96
Intel(R) Rapid Start Technology [Disabled] 97
Intel AMT [Enabled] 98
Unconfigure ME [Disabled] 98
USB Devices 99
Legacy USB Support [Enabled] 99
Serial Port [Enabled] 101
Change Settings [Auto] 101
Serial Port [Enabled] 102
Change Settings [Auto] 102
Device Mode [RS422/485] 103
Serial Port [Enabled] 103
Change Settings [Auto] 103
Serial Port [Enabled] 103
Change Settings [Auto] 104
Device Mode [RS422/485] 104
Serial Port [Enabled] 104
Change Settings [Auto] 105
Serial Port [Enabled] 105
Change Settings [Auto] 106
Parallel Port [Enabled] 107
Change Settings [Auto] 107
Device Mode [STD Printer Mode] 108

PC Health Status 109
CPU_FAN1 Smart Fan Control/SYS_FAN1 Smart Fan Control [Auto Mode] 110
Fan start/off temperature 110
Fan start PWM 111
Fan slope PWM 111
Console Redirection [Disabled] 112
Terminal Type [ANSI] 113
Bits per second [115200] 113
Data Bits [8] 113
Parity [None] 113
Stop Bits [1] 114
Auto Recovery Function [Disabled] 115
Restore on AC Power Loss [Last State] 116
Power Saving Function [Disabled] 116
PCIEX16 Power [1 x16 PCIE] 117
USB SW1 Power [+5V DUAL] 117
USB SW2 Power [+5V DUAL] 117
PCIe Speed [Gen1] 118
Detect Non-Compliance Device [Enabled] 118
Azalia [Enabled] 119
Primary Display [Auto] 121
DVMT Pre-Allocated [256M] 121
DVMT Total Gfx Mem [MAX] 121
Primary IGFX Boot Display [VBIOS Default] 122
PEG0-Gen X [Gen1] 123
Enable PEG [Enabled] 123
Detect Non-Compliance [Enabled] 124
Bootup NumLock State [On] 125
Quiet Boot [Enabled] 126
Option ROM Messages [Force BIOS] 126
Launch PXE OpROM [Disabled] 126
UEFI Boot [Disabled] 126
Administrator Password 127
User Password 127
Save Changes and Reset 128

Discard Changes and Reset 128
Restore Defaults 128
Save as User Defaults 128
Restore User Defaults 128

Appendix

B

One Key Recovery

B.1 One Key Recovery Introduction

The IEI one key recovery is an easy-to-use front end for the Norton Ghost system backup and recovery tool. This tool provides quick and easy shortcuts for creating a backup and reverting to that backup or reverting to the factory default settings.

NOTE:

The latest One Key Recovery software provides an auto recovery function that allows a system running Microsoft Windows OS to automatically restore from the factory default image after encountering a Blue Screen of Death (BSoD) or a hang for around 10 minutes. Please refer to Section B.3 for the detailed setup procedure.

The IEI One Key Recovery tool menu is shown below.

Figure B-1: IEI One Key Recovery Tool Menu

Prior to using the IEI One Key Recovery tool (as shown in **Figure B-1**) to backup or restore Windows system, five setup procedures are required.

1. Hardware and BIOS setup (see **Section B.2.1**)
2. Create partitions (see **Section B.2.2**)
3. Install operating system, drivers and system applications (see **Section B.2.3**)
4. Build the recovery partition (see **Section B.2.4**)
5. Create factory default image (see **Section B.2.5**)

After completing the five initial setup procedures as described above, users can access the recovery tool by pressing <**F3**> while booting up the system. The detailed information of each function is described in **Section B.5**.

NOTE:

The initial setup procedures for Linux system are described in **Section B.3**.

B.1.1 System Requirement

NOTE:

The recovery CD can only be used with IEI products. The software will fail to run and a warning message will appear when used on non-IEI hardware.

To create the system backup, the main storage device must be split into two partitions (three partitions for Linux). The first partition will be for the operating system, while the second partition will be invisible to the operating system and contain the backup made by the one key recovery software.

The partition created for recovery images must be big enough to contain both the factory default image and the user backup image. The size must be calculated before creating the

partitions. Please take the following table as a reference when calculating the size of the partition.

	OS	OS Image after Ghost	Compression Ratio
Windows® 7	7 GB	5 GB	70%
Windows® XPE	776 MB	560 MB	70%
Windows® CE 6.0	36 MB	28 MB	77%

NOTE:

Specialized tools are required to change the partition size if the operating system is already installed.

B.1.2 Supported Operating System

The recovery CD is compatible with both Microsoft Windows and Linux operating systems (OS). The supported OS versions are listed below.

- Microsoft Windows
  - Windows 2000
  - Windows XP (Service Pack 2 or 3 required)
  - Windows Vista
  - Windows 7
  - Windows CE 5.0
  - Windows CE 6.0
  - Windows XP Embedded
  - Windows Embedded Standard 7

NOTE:

The auto recovery function (described in Section B.3) and the restore through LAN function (described in Section B.6) are not supported in the Windows CE 5.0/6.0 operating system environment.

- Linux
  - Fedora Core 12 (Constantine)
  - Fedora Core 11 (Leonidas)
  - Fedora Core 10 (Cambridge)
  - Fedora Core 8 (Werewolf)
  - Fedora Core 7 (Moonshine)
  - RedHat RHEL-5.4
  - RedHat 9 (Ghirke)
  - Ubuntu 8.10 (Intrepid)
  - Ubuntu 7.10 (Gutsy)
  - Ubuntu 6.10 (Edgy)
  - Debian 5.0 (Lenny)
  - Debian 4.0 (Etch)
  - SuSe 11.2
  - SuSe 10.3

NOTE:

Installing unsupported OS versions may cause the recovery tool to fail.

B.2 Setup Procedure for Windows

Prior to using the recovery tool to backup or restore, a few setup procedures are required.

Step 1: Hardware and BIOS setup (see **Section B.2.1**)

Step 2: Create partitions (see **Section B.2.2**)

Step 3: Install operating system, drivers and system applications (see **Section B.2.3**)

Step 4: Build the recovery partition (see **Section B.2.4**) or build the auto recovery partition (see **Section B.3**)

Step 5: Create factory default image (see **Section B.2.5**)

The detailed descriptions are described in the following sections.

NOTE:

The setup procedures described below are for Microsoft Windows operating system users. For Linux, most of the setup procedures are the same except for several steps described in **Section B.3**.

B.2.1 Hardware and BIOS Setup

Step 1: Make sure the system is powered off and unplugged.

Step 2: Install a hard drive or SSD in the system. An unformatted and unpartitioned disk is recommended.

Step 3: Connect an optical disk drive to the system and insert the recovery CD.

Step 4: Turn on the system.

Step 5: Press the <**DELETE**> key as soon as the system is turned on to enter the BIOS.

Step 6: Select the connected optical disk drive as the 1st boot device. (**Boot → Boot Device Priority → 1st Boot Device**).

Step 7: Save changes and restart the computer. Continue to the next section for instructions on partitioning the internal storage.

B.2.2 Create Partitions

To create the system backup, the main storage device must be split into two partitions (three partitions for Linux). The first partition will be for the operating system, while the

second partition will be invisible to the operating system and contain the backup made by the one key recovery software.

Step 1: Put the recovery CD in the optical drive of the system.

Step 2: **Boot the system from recovery CD**. When prompted, press any key to boot from the recovery CD. It will take a while to launch the recovery tool. Please be patient!

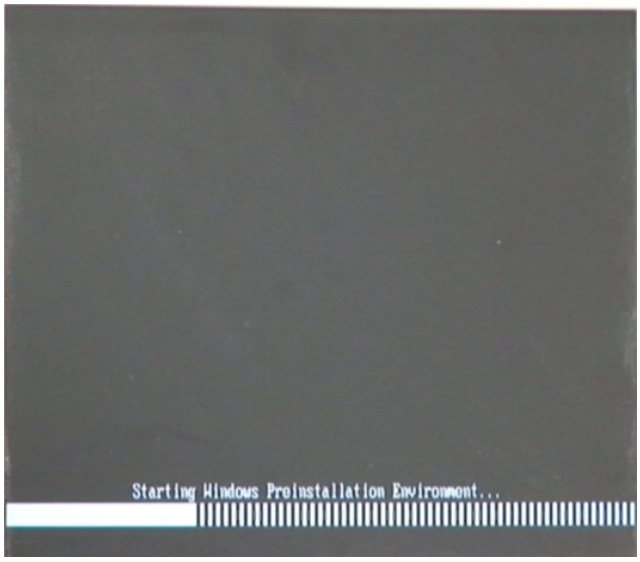


Figure B-2: Launching the Recovery Tool

Step 3: The recovery tool setup menu is shown as below.

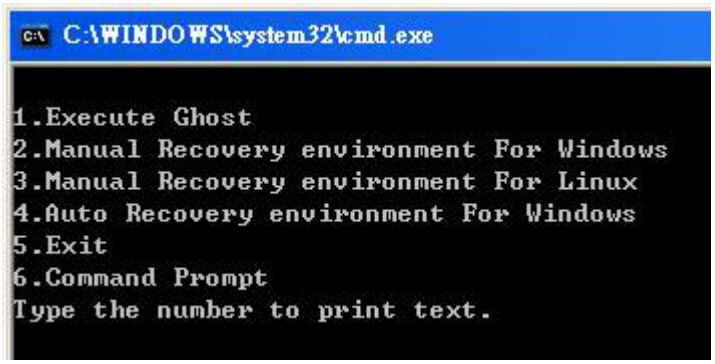


Figure B-3: Recovery Tool Setup Menu

Step 4: Press <**6**> then <Enter>.

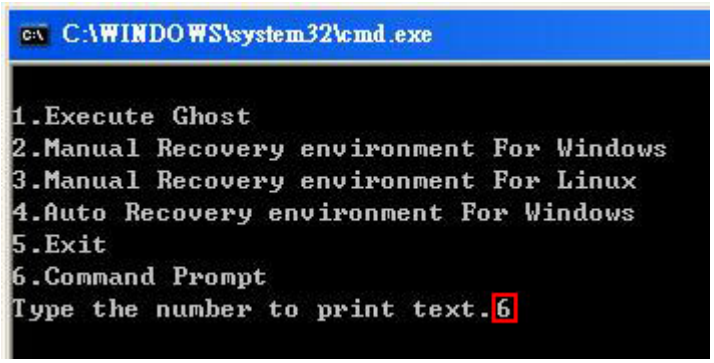


Figure B-4: Command Prompt

Step 5: The command prompt window appears. Type the following commands (marked in red) to create two partitions. One is for the OS installation; the other is for saving recovery files and images which will be an invisible partition.

(Press <Enter> after entering each line below)

system32>diskpart

DISKPART>list vol

DISKPART>sel disk 0

DISKPART>create part pri size= ___

DISKPART>assign letter=N

DISKPART>create part pri size= ___

DISKPART>assign letter=F

DISKPART>exit

system32>format N: /fs:ntfs /q /y

system32>format F: /fs:ntfs /q /v:Recovery /y

system32>exit

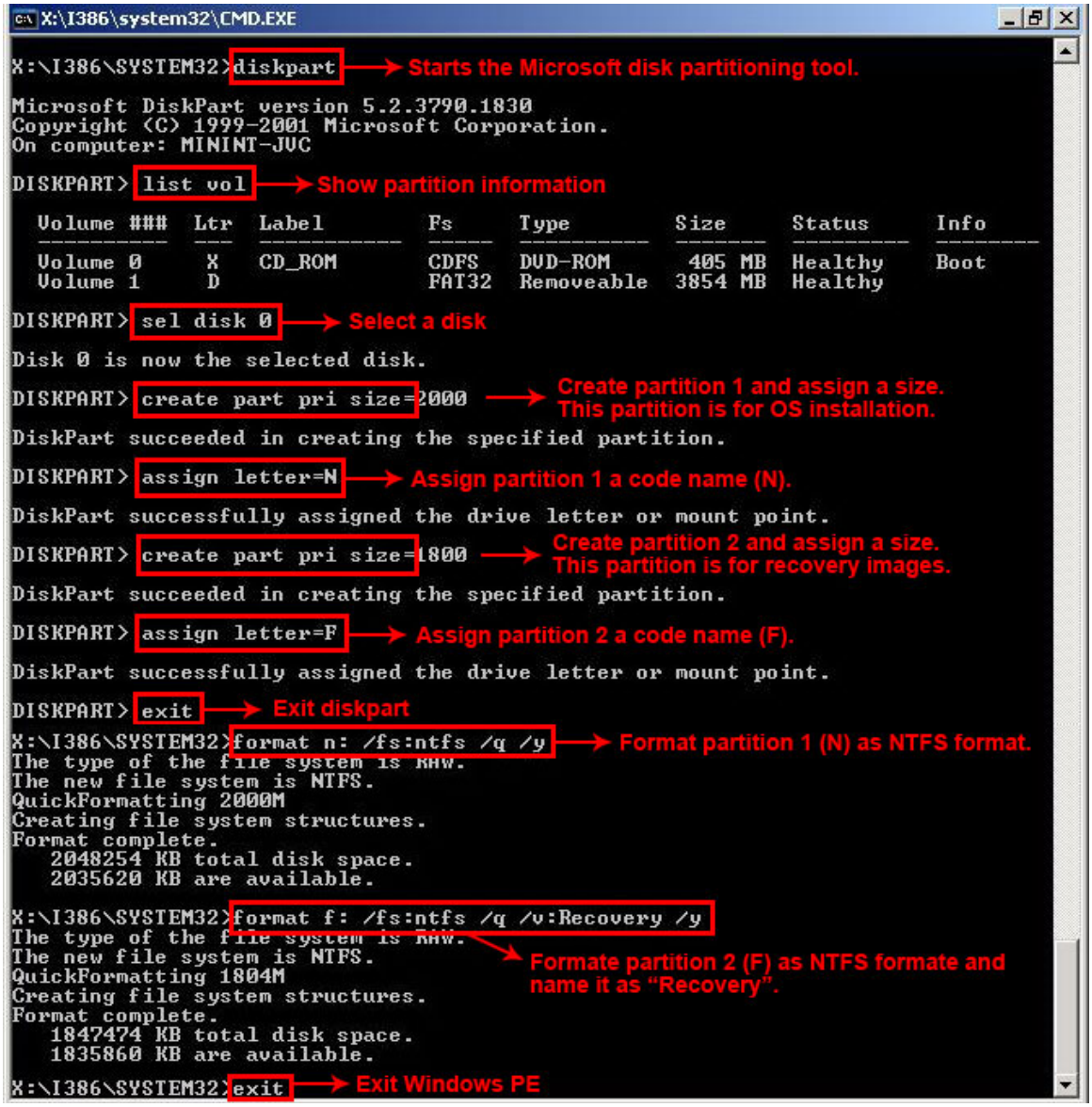
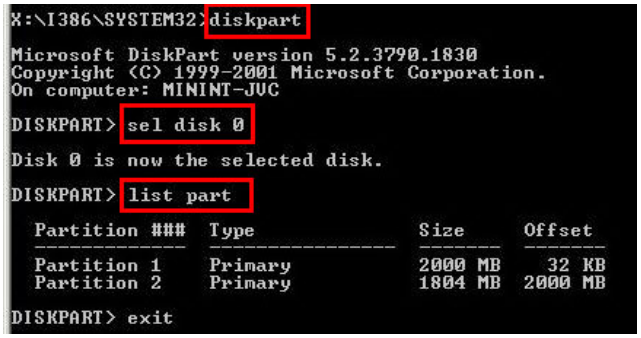

X:\I386\system32\CMD.EXE
X:\I386\SYSTEM32>diskpart
Starts the Microsoft disk partitioning tool.
Microsoft DiskPart version 5.2.3790.1830
Copyright (C) 1999-2001 Microsoft Corporation.
On computer: MININT-JVC
DISKPART> list vol
Show partition information
Volume ### Ltr Label Fs Type Size Status Info
Volume 0 X CD_ROM CDFS DVD-ROM 405 MB Healthy Boot
Volume 1 D FAT32 Removeable 3854 MB Healthy
DISKPART> sel disk 0
Select a disk
Disk 0 is now the selected disk.
DISKPART> create part pri size=2000
Create partition 1 and assign a size.
This partition is for OS installation.
DiskPart succeeded in creating the specified partition.
DISKPART> assign letter=N
Assign partition 1 a code name (N).
DiskPart successfully assigned the drive letter or mount point.
DISKPART> create part pri size=1800
Create partition 2 and assign a size.
This partition is for recovery images.
DiskPart succeeded in creating the specified partition.
DISKPART> assign letter=F
Assign partition 2 a code name (F).
DiskPart successfully assigned the drive letter or mount point.
DISKPART> exit
Exit diskpart
X:\I386\SYSTEM32>format n: /fs:ntfs /q /y
Format partition 1 (N) as NTFS format.
The type of the file system is RAW.
The new file system is NTFS.
QuickFormatting 2000M
Creating file system structures.
Format complete.
2048254 KB total disk space.
2035620 KB are available.
X:\I386\SYSTEM32>format f: /fs:ntfs /q /v:Recovery /y
The type of the file system is RAW.
The new file system is NTFS.
QuickFormatting 1804M
Creating file system structures.
Format complete.
1847474 KB total disk space.
1835860 KB are available.
Formate partition 2 (F) as NTFS formate and
name it as “Recovery”.
X:\I386\SYSTEM32>exit
Exit Windows PE

Figure B-5: Partition Creation Commands

NOTE:

Use the following commands to check if the partitions were created successfully.


X:\I386\SYSTEM32>diskpart
Microsoft DiskPart version 5.2.3790.1830
Copyright (C) 1999-2001 Microsoft Corporation.
On computer: MININT-JVC
DISKPART> sel disk 0
Disk 0 is now the selected disk.
DISKPART> list part
Partition ### Type Size Offset
Partition 1 Primary 2000 MB 32 KB
Partition 2 Primary 1804 MB 2000 MB
DISKPART> exit

Step 6: Press any key to exit the recovery tool and automatically reboot the system.

Please continue to the following procedure: Build the Recovery Partition.

B.2.3 Install Operating System, Drivers and Applications

Install the operating system onto the unlabelled partition. The partition labeled "Recovery" is for use by the system recovery tool and should not be used for installing the operating system or any applications.

NOTE:

The operating system installation program may offer to reformat the chosen partition. DO NOT format the partition again. The partition has already been formatted and is ready for installing the new operating system.

To install the operating system, insert the operating system installation CD into the optical drive. Restart the computer and follow the installation instructions.

B.2.4 Building the Recovery Partition

Step 1: Put the recover CD in the optical drive.

Step 2: Start the system.

Step 3: **Boot the system from the recovery CD**. When prompted, press any key to boot from the recovery CD. It will take a while to launch the recovery tool. Please be patient!

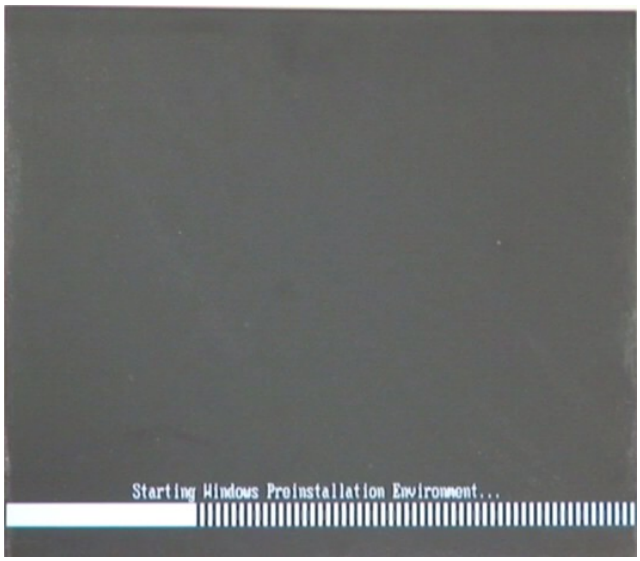


Figure B-6: Launching the Recovery Tool

Step 4: When the recovery tool setup menu appears, press <**2**> then <Enter>.

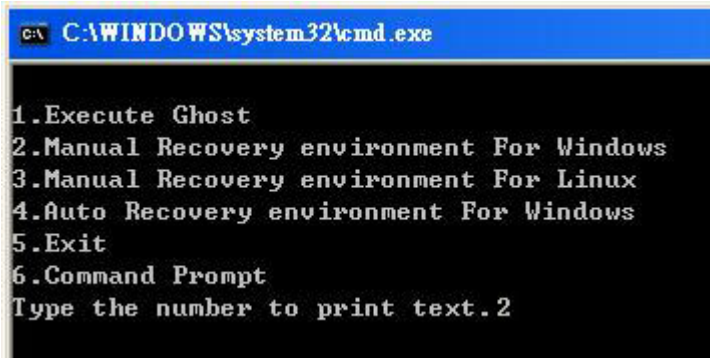


Figure B-7: Manual Recovery Environment for Windows

Step 5: The Symantec Ghost window appears and starts configuring the system to build a recovery partition. In this process the partition created for recovery files in **Section B.2.2** is hidden and the recovery tool is saved in this partition.

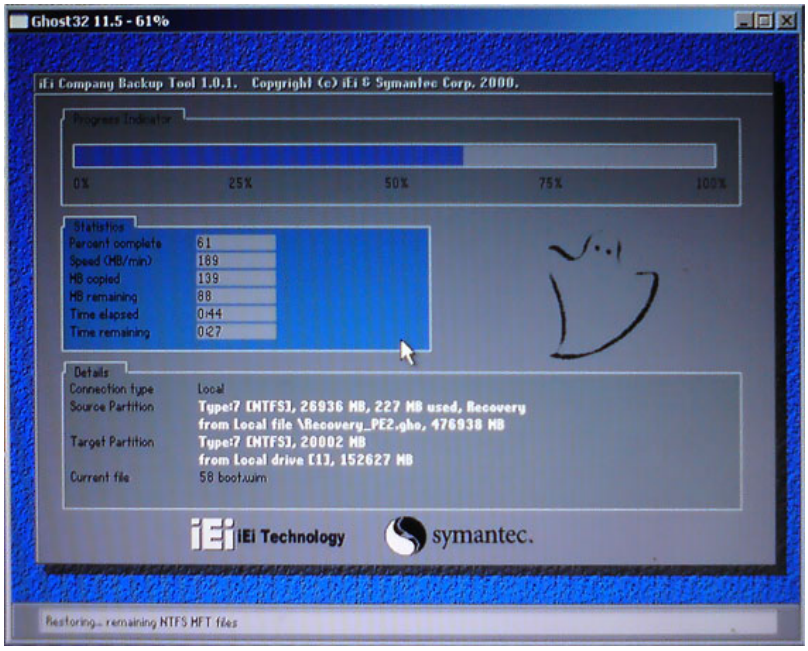


Figure B-8: Building the Recovery Partition

Step 6: After completing the system configuration, press any key in the following window to reboot the system.

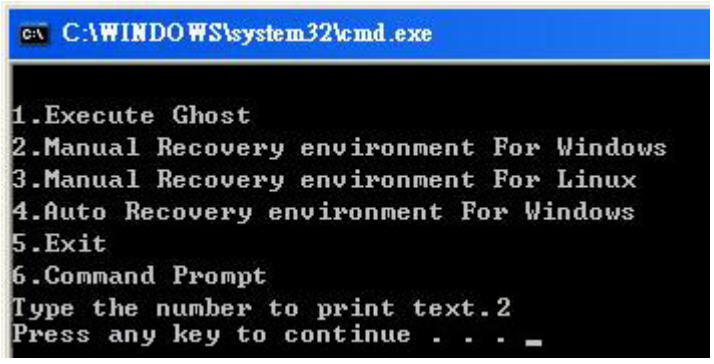


Figure B-9: Press Any Key to Continue

Step 7: Eject the recovery CD.

B.2.5 Create Factory Default Image

NOTE:

Before creating the factory default image, please configure the system to a factory default environment, including driver and application installations.

To create a factory default image, please follow the steps below.

Step 1: Turn on the system. When the following screen displays (**Figure B-10**), press the <**F3**> key to access the recovery tool. The message will display for 10 seconds, please press F3 before the system boots into the operating system.

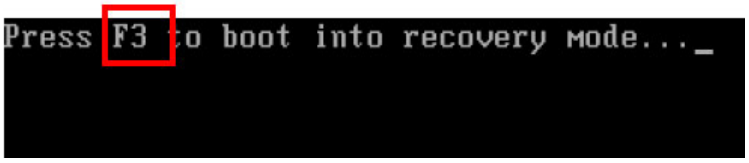


Figure B-10: Press F3 to Boot into Recovery Mode

Step 2: The recovery tool menu appears. Type <**4**> and press <**Enter**>. (**Figure B-11**)

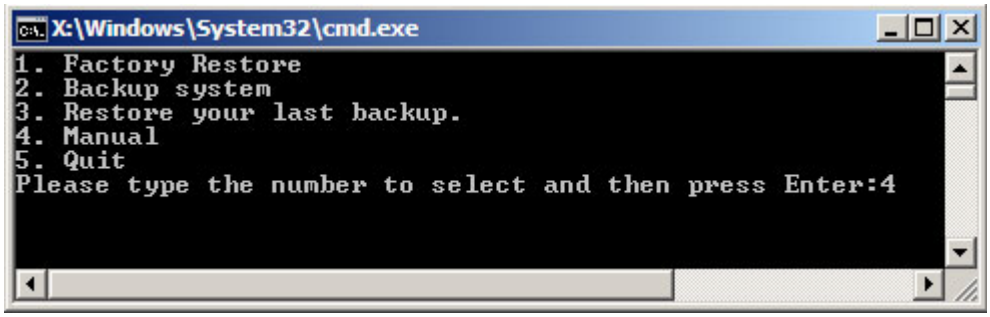


Figure B-11: Recovery Tool Menu

Step 3: The About Symantec Ghost window appears. Click **OK** button to continue.

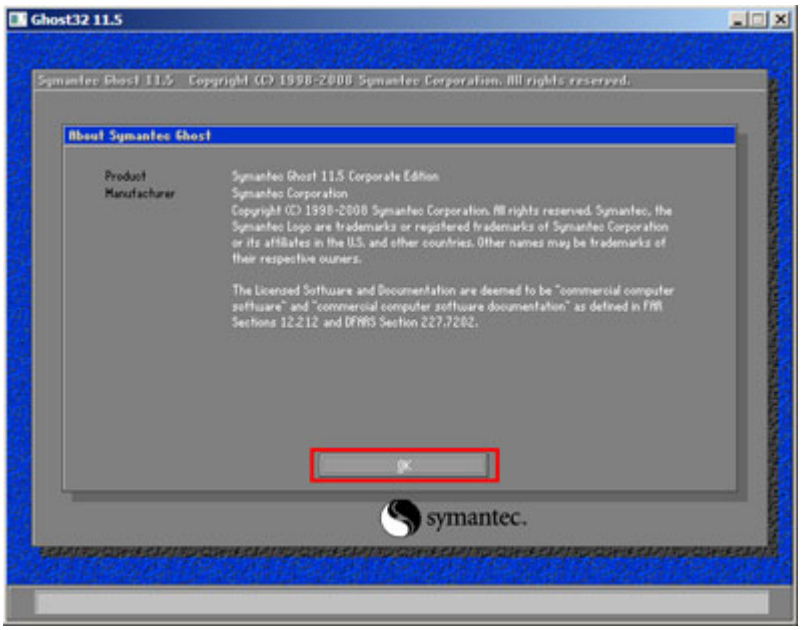

Ghost32 11.5
Symantec Ghost 11.5 Copyright (C) 1998-2008 Symantec Corporation. All rights reserved.
About Symantec Ghost
Product
Manufacturer
Symantec Ghost 11.5 Corporate Edition
Symantec Corporation
Copyright (C) 1998-2008 Symantec Corporation. All rights reserved. Symantec, the Symantec Logo are trademarks or registered trademarks of Symantec Corporation or its affiliates in the U.S. and other countries. Other names may be trademarks of their respective owners.
The Licensed Software and Documentation are deemed to be "commercial computer software" and "commercial computer software documentation" as defined in FAR Sections 12.212 and DFARS Section 227.7202.
OK
symantec.

Figure B-12: About Symantec Ghost Window

Step 4: Use mouse to navigate to the option shown below (**Figure B-13**).

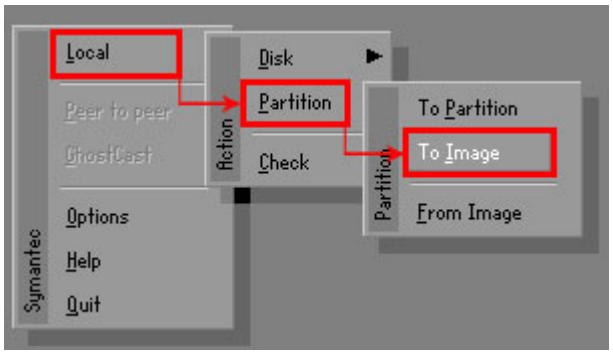


Figure B-13: Symantec Ghost Path

Step 5: Select the local source drive (Drive 1) as shown in **Figure B-14**. Then click OK.

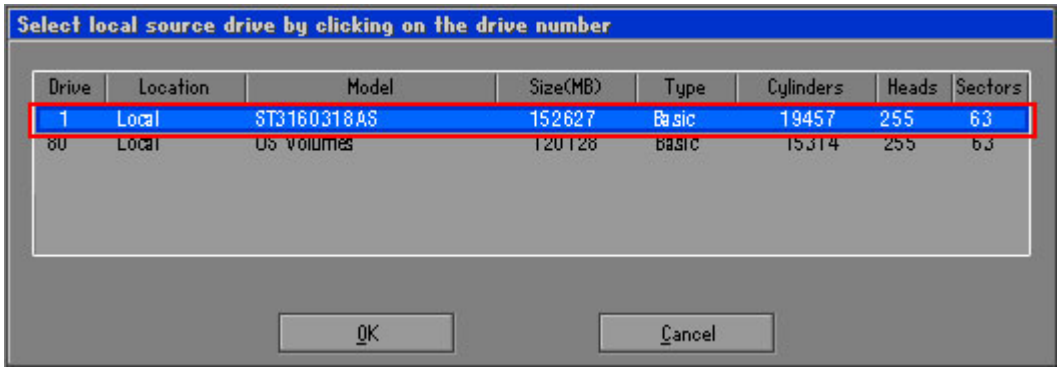


Figure B-14: Select a Local Source Drive

Step 6: Select a source partition (Part 1) from basic drive as shown in **Figure B-15**. Then click OK.

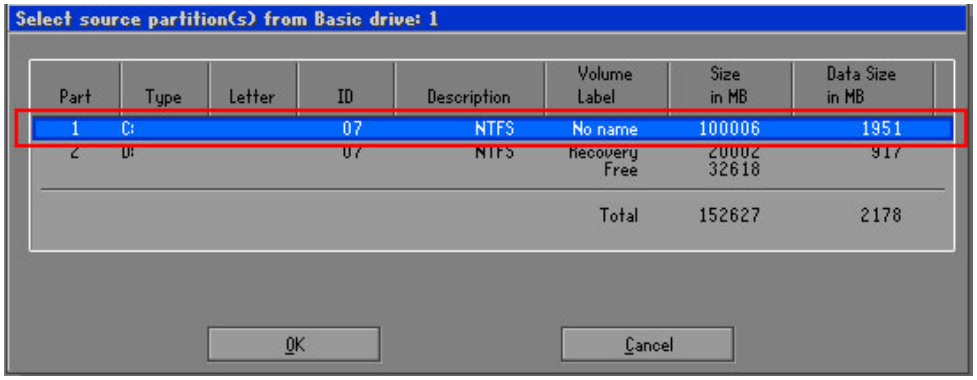


Figure B-15: Select a Source Partition from Basic Drive

Step 7: Select **1.2: [Recovery] NTFS drive** and enter a file name called **iei** (**Figure B-16**). Click **Save**. The factory default image will then be saved in the selected recovery drive and named IEI.GHO.

WARNING:

The file name of the factory default image must be **iei.GHO**.

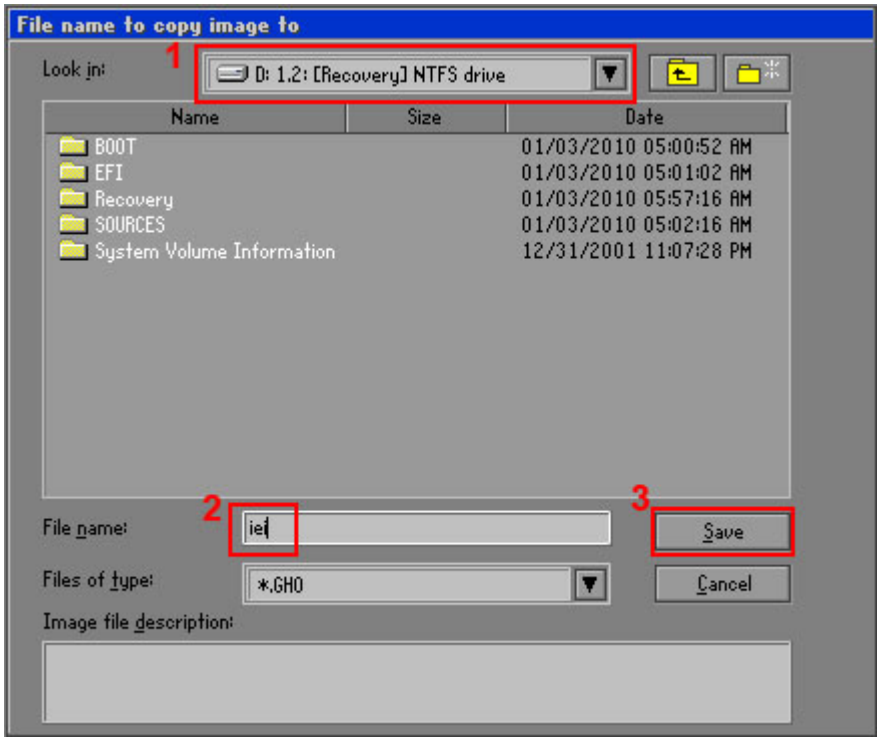


Figure B-16: File Name to Copy Image to

Step 8: When the Compress Image screen in **Figure B-17** prompts, click **High** to make the image file smaller.

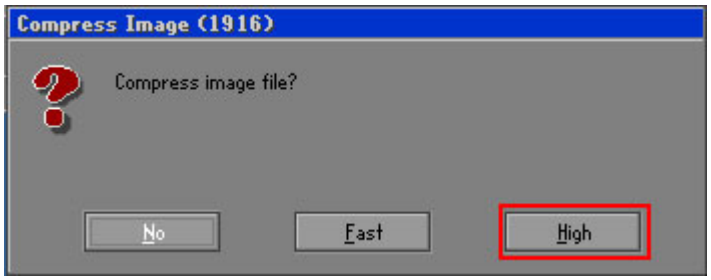


Figure B-17: Compress Image

Step 9: The Proceed with partition image creation window appears, click **Yes** to continue.

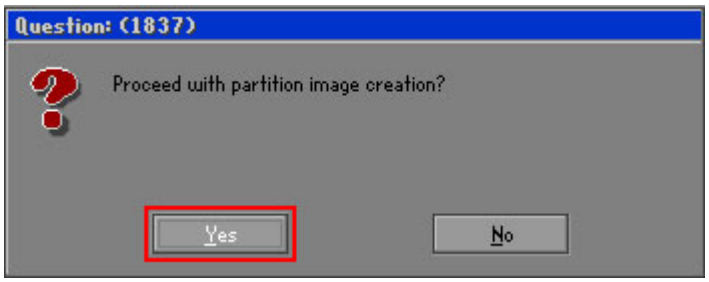


Figure B-18: Image Creation Confirmation

Step 10: The Symantec Ghost starts to create the factory default image (**Figure B-19**).

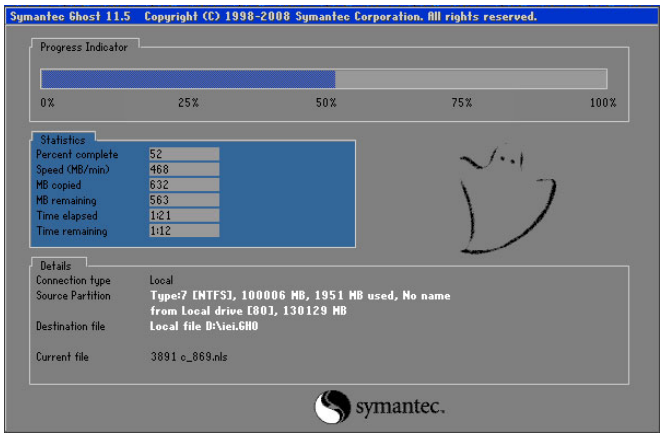


Figure B-19: Image Creation Complete

Step 11: When the image creation completes, a screen prompts as shown in **Figure B-20**. Click **Continue** and close the Ghost window to exit the program.

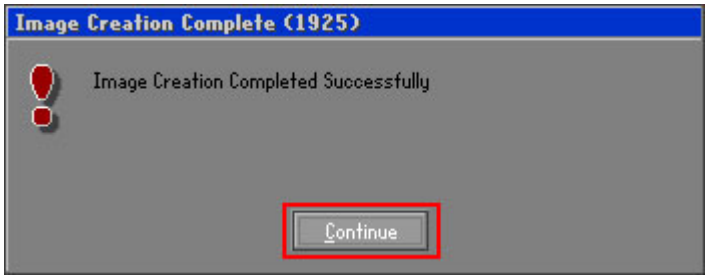


Figure B-20: Image Creation Complete

Step 12: The recovery tool main menu window is shown as below. Press any key to reboot the system.

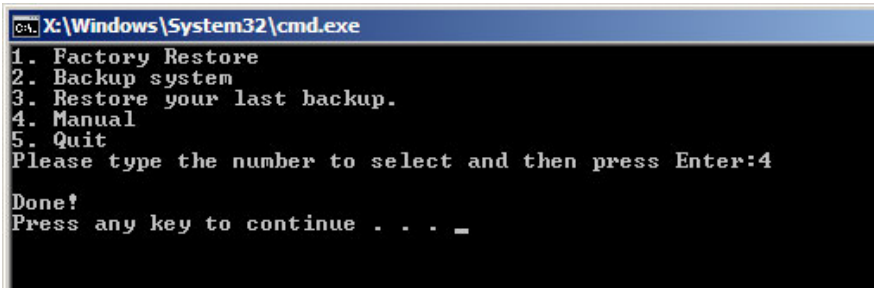


Figure B-21: Press Any Key to Continue

B.3 Auto Recovery Setup Procedure

The auto recovery function allows a system to automatically restore from the factory default image after encountering a Blue Screen of Death (BSoD) or a hang for around 10 minutes. To use the auto recovery function, follow the steps described in the following sections.

CAUTION:

The auto recovery function can only run on a Microsoft Windows system with the following OS versions:

- Windows 2000
- Windows 7
- Windows XP
- Windows XP Embedded
- Windows Vista
- Windows Embedded Standard 7

CAUTION:

The setup procedure may include a step to create a factory default image. It is suggested to configure the system to a factory default environment before the configuration, including driver and application installations.

Step 1: Follow the steps described in **Section B.2.1 ~ Section B.2.3** to setup BIOS, create partitions and install operating system.

Step 2: Install the auto recovery utility into the system by double clicking the **Utility/AUTORECOVERY-SETUP.exe** in the One Key Recovery CD. This utility MUST be installed in the system, otherwise, the system will automatically restore from the factory default image every ten (10) minutes.

Figure B-22: Auto Recovery Utility

Step 3: **Disable the automatically restart function before creating the factory default image**. Go to: My Computer → Properties → Advanced. Click the Settings button of Startup and Recovery. Deselect “Automatically restart”. Click OK to save the settings and exit. (See Figure B-23)

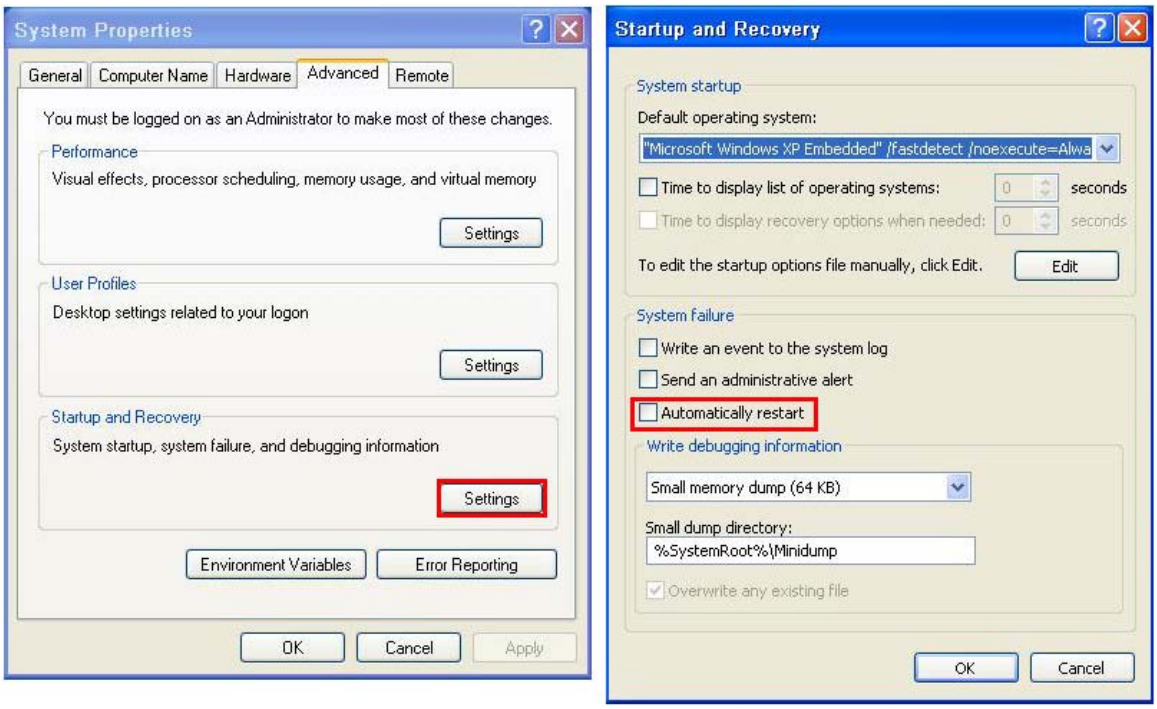


Figure B-23: Disable Automatically Restart

Step 4: Reboot the system from the recovery CD. When prompted, press any key to boot from the recovery CD. It will take a while to launch the recovery tool. Please be patient!

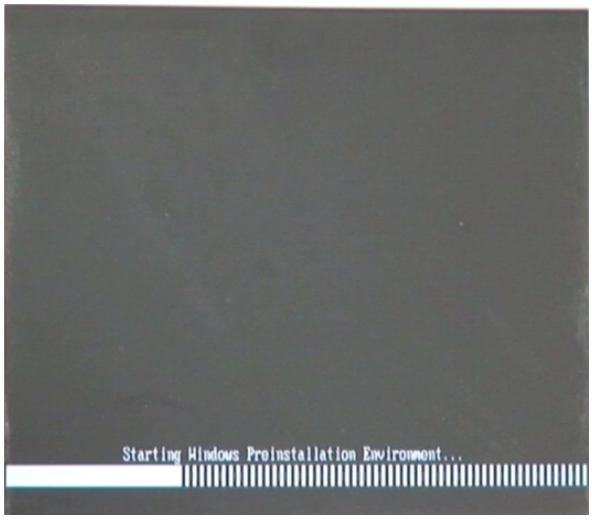


Figure B-24: Launching the Recovery Tool

Step 5: When the recovery tool setup menu appears, press <**4**> then <Enter>.

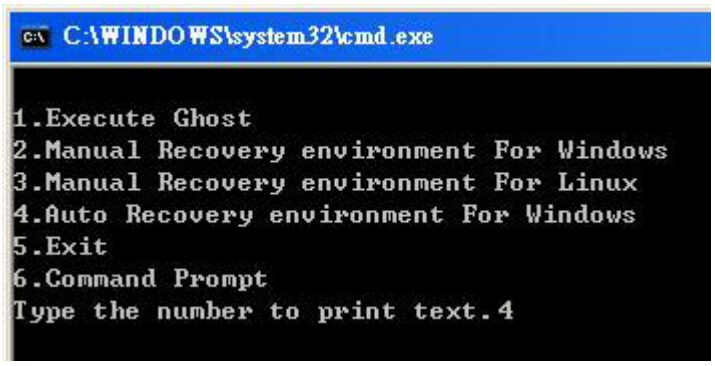


Figure B-25: Auto Recovery Environment for Windows

Step 6: The Symantec Ghost window appears and starts configuring the system to build an auto recovery partition. In this process the partition created for recovery files in **Section B.2.2** is hidden and the auto recovery tool is saved in this partition.

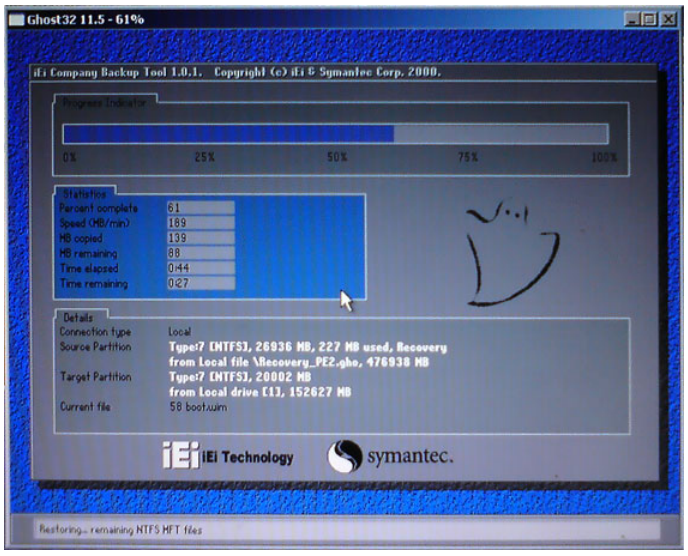


Figure B-26: Building the Auto Recovery Partition

Step 7: After completing the system configuration, the following message prompts to confirm whether to create a factory default image. Type **Y** to have the system create a factory default image automatically. Type **N** within 6 seconds to skip this

process (The default option is YES). It is suggested to choose YES for this option.

Figure B-27: Factory Default Image Confirmation

Step 8: The Symantec Ghost starts to create the factory default image (**Figure B-28**).

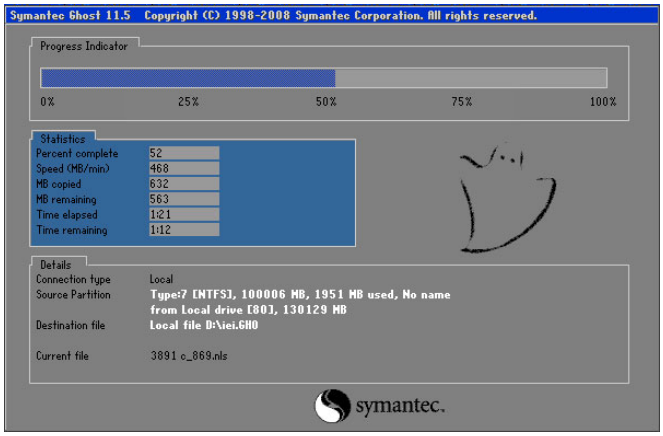


Figure B-28: Image Creation Complete

Step 9: After completing the system configuration, press any key in the following window to restart the system.

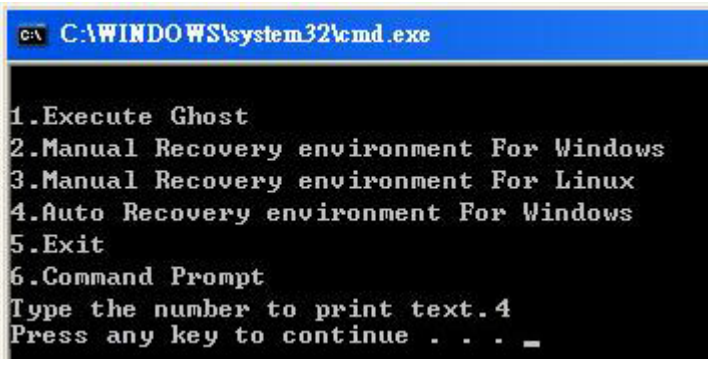
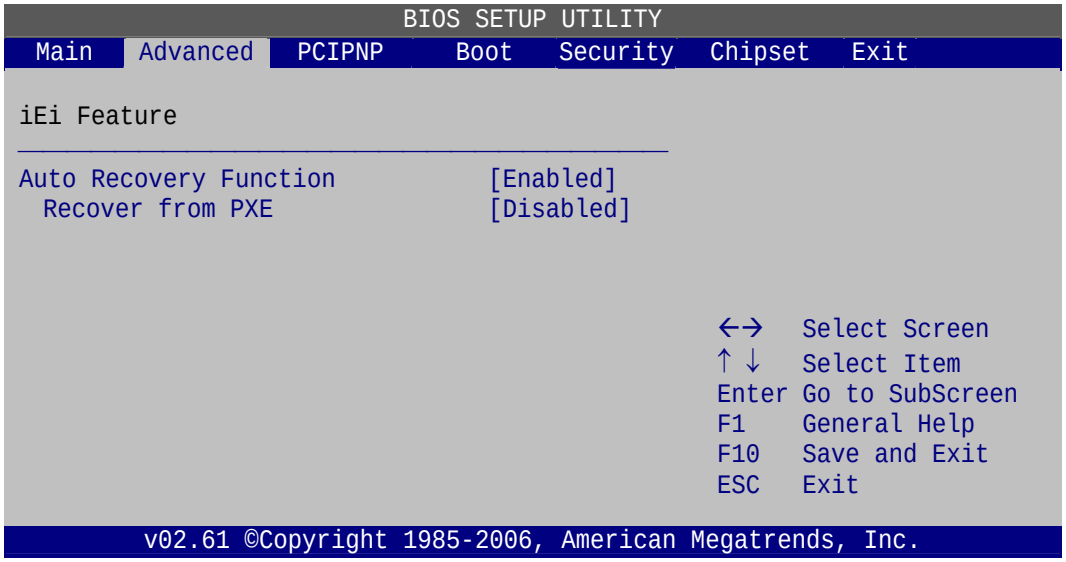

C:\WINDOWS\system32\cmd.exe
1.Execute Ghost
2.Manual Recovery environment For Windows
3.Manual Recovery environment For Linux
4.Auto Recovery environment For Windows
5.Exit
6.Command Prompt
Type the number to print text.4
Press any key to continue . . . _

Figure B-29: Press any key to continue

Step 10: Eject the One Key Recovery CD and restart the system.

Step 11: Press the <**DELETE**> key as soon as the system is turned on to enter the BIOS.

Step 12: Enable the Auto Recovery Function option (**Advanced → iEi Feature → Auto Recovery Function**).



BIOS Menu 30: IEI Feature

Step 13: Save changes and restart the system. If the system encounters a Blue Screen of Death (BSoD) or a hang for around 10 minutes, it will automatically restore from the factory default image.

B.4 Setup Procedure for Linux

The initial setup procedure for Linux system is mostly the same with the procedure for Microsoft Windows. Please follow the steps below to setup recovery tool for Linux OS.

Step 1: **Hardware and BIOS setup**. Refer to **Section B.2.1**.

Step 2: **Install Linux operating system**. Make sure to install GRUB (v0.97 or earlier) MBR type and Ext3 partition type. Leave enough space on the hard drive to create the recover partition later.

NOTE:

If the Linux OS is not installed with GRUB (v0.97 or earlier) and Ext3, the Symantec Ghost may not function properly.

While installing Linux OS, please create two partitions:

- Partition 1: **/**
- Partition 2: **SWAP**

NOTE:

Please reserve enough space for partition 3 for saving recovery images.

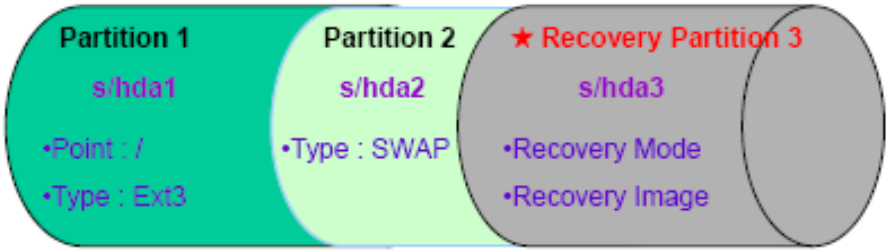


Figure B-30: Partitions for Linux

Step 3: **Create a recovery partition**. Insert the recovery CD into the optical disk drive. Follow **Step 1** ~ **Step 3** described in **Section B.2.2**. Then type the following commands (marked in red) to create a partition for recovery images.

system32>diskpart

DISKPART>list vol

DISKPART>sel disk 0

DISKPART>create part pri size= ___

DISKPART>assign letter=N

DISKPART>exit

system32>format N: /fs:ntfs /q /v:Recovery /y

system32>exit

Step 4: **Build the recovery partition**. Press any key to boot from the recovery CD. It will take a while to launch the recovery tool. Please be patient. When the recovery tool setup menu appears, type <**3**> and press <Enter> (**Figure B-31**). The Symantec Ghost window appears and starts configuring the system to build a recovery partition. After completing the system configuration, press any key to reboot the system. Eject the recovery CD.

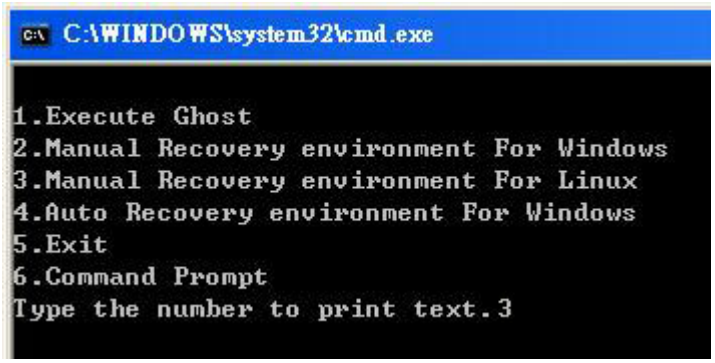


Figure B-31: Manual Recovery Environment for Linux

Step 5: **Access the recovery tool main menu by modifying the "menu.lst"**. To first access the recovery tool main menu, the menu.lst must be modified. In Linux, enter Administrator (root). When prompt appears, type:

cd /boot/grub

vi menu.lst

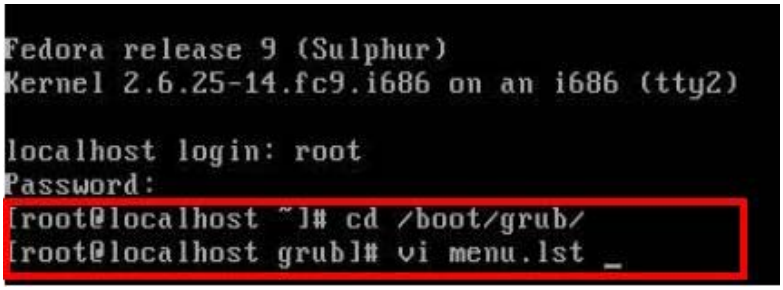
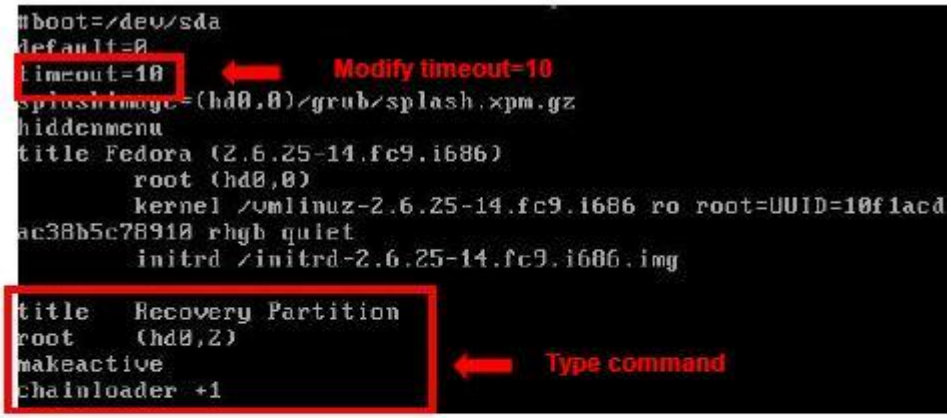


Figure B-32: Access menu.lst in Linux (Text Mode)

Step 6: Modify the menu.lst as shown below.



- Type command:
  title Recovery Partition
  root (hd0,2)
  makeactive
  chainloader +1

Step 7: The recovery tool menu appears. (**Figure B-33**)

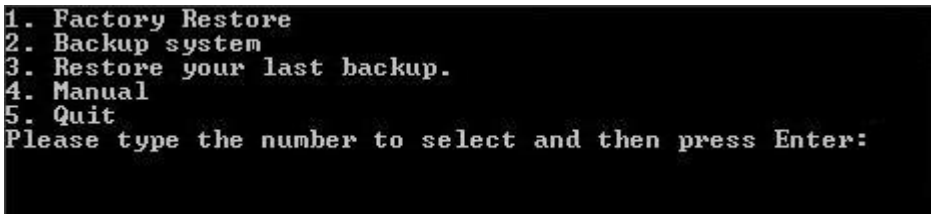

1. Factory Restore
2. Backup system
3. Restore your last backup.
4. Manual
5. Quit
Please type the number to select and then press Enter:

Figure B-33: Recovery Tool Menu

Step 8: **Create a factory default image**. Follow **Step 2** ~ **Step 12** described in **Section B.2.5** to create a factory default image.

B.5 Recovery Tool Functions

After completing the initial setup procedures as described above, users can access the recovery tool by pressing <**F3**> while booting up the system. However, if the setup procedure in Section B.3 has been completed and the auto recovery function is enabled, the system will automatically restore from the factory default image without pressing the F3 key. The recovery tool main menu is shown below.

Figure B-34: Recovery Tool Main Menu

The recovery tool has several functions including:

1. **Factory Restore**: Restore the factory default image (iei.GHO) created in Section B.2.5.
2. **Backup system**: Create a system backup image (iei_user.GHO) which will be saved in the hidden partition.
3. **Restore your last backup**: Restore the last system backup image
4. **Manual**: Enter the Symantec Ghost window to configure manually.
5. **Quit**: Exit the recovery tool and restart the system.

WARNING:

Please do not turn off the system power during the process of system recovery or backup.

WARNING:

All data in the system will be deleted during the system recovery. Please backup the system files before restoring the system (either Factory Restore or Restore Backup).

B.5.1 Factory Restore

To restore the factory default image, please follow the steps below.

Step 1: Type <**1**> and press <**Enter**> in the main menu.

Step 2: The Symantec Ghost window appears and starts to restore the factory default. A factory default image called **iei.GHO** is created in the hidden Recovery partition.

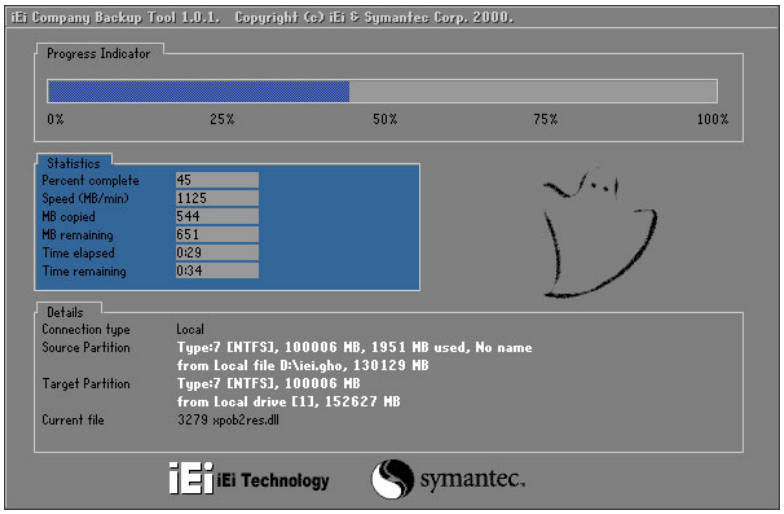


Figure B-35: Restore Factory Default

Step 3: The screen shown in **Figure B-36** appears when completed. Press any key to reboot the system.

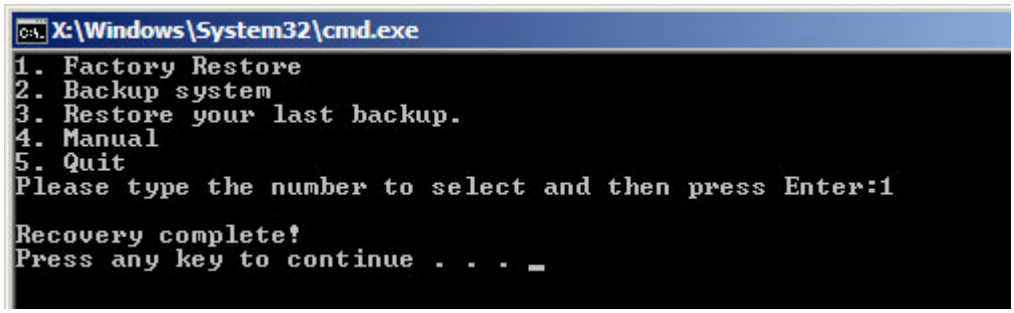

X:\Windows\System32\cmd.exe
1. Factory Restore
2. Backup system
3. Restore your last backup.
4. Manual
5. Quit
Please type the number to select and then press Enter:1
Recovery complete!
Press any key to continue . . .

Figure B-36: Recovery Complete Window

B.5.2 Backup System

To backup the system, please follow the steps below.

Step 1: Type <**2**> and press <**Enter**> in the main menu.

Step 2: The Symantec Ghost window appears and starts to backup the system. A backup image called **iei_user.GHO** is created in the hidden Recovery partition.

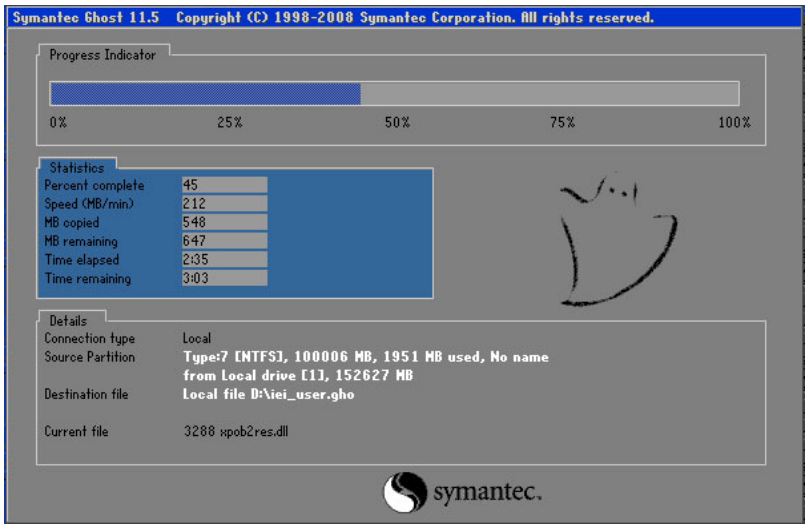


Figure B-37: Backup System

Step 3: The screen shown in **Figure B-38** appears when system backup is complete. Press any key to reboot the system.

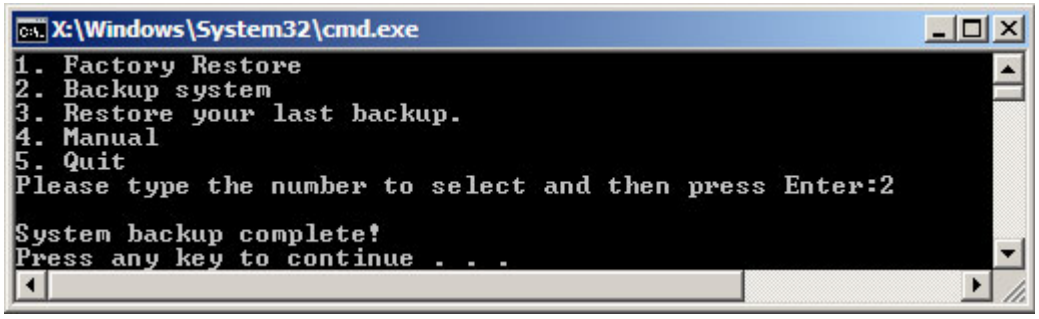

X:\Windows\System32\cmd.exe
1. Factory Restore
2. Backup system
3. Restore your last backup.
4. Manual
5. Quit
Please type the number to select and then press Enter:2
System backup complete!
Press any key to continue . . .

Figure B-38: System Backup Complete Window

B.5.3 Restore Your Last Backup

To restore the last system backup, please follow the steps below.

Step 1: Type <**3**> and press <**Enter**> in the main menu.

Step 2: The Symantec Ghost window appears and starts to restore the last backup image (iei_user.GHO).

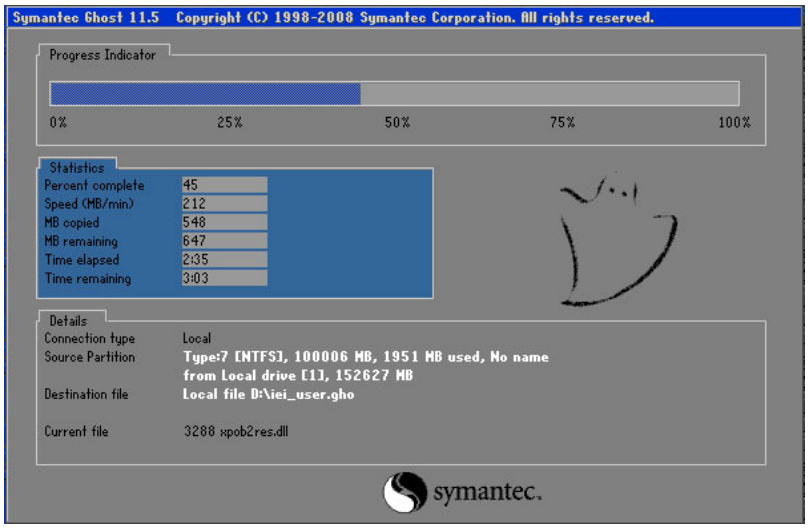


Figure B-39: Restore Backup

Step 3: The screen shown in **Figure B-40** appears when backup recovery is complete. Press any key to reboot the system.

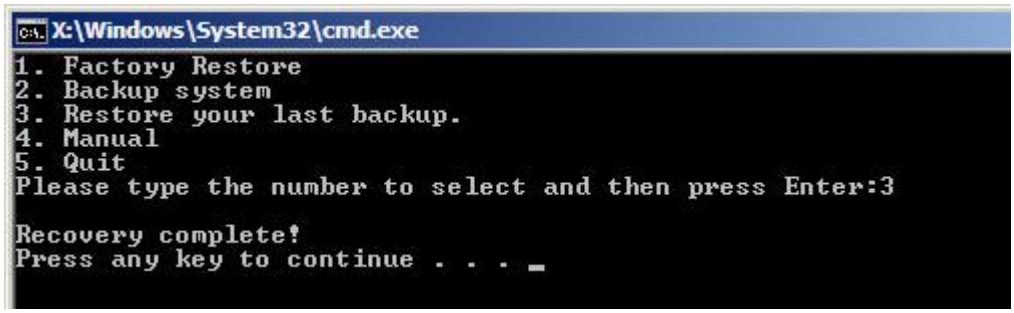

X:\Windows\System32\cmd.exe
1. Factory Restore
2. Backup system
3. Restore your last backup.
4. Manual
5. Quit
Please type the number to select and then press Enter:3
Recovery complete!
Press any key to continue . . .

Figure B-40: Restore System Backup Complete Window

B.5.4 Manual

To restore the last system backup, please follow the steps below.

Step 1: Type <**4**> and press <**Enter**> in the main menu.

Step 2: The Symantec Ghost window appears. Use the Ghost program to backup or recover the system manually.

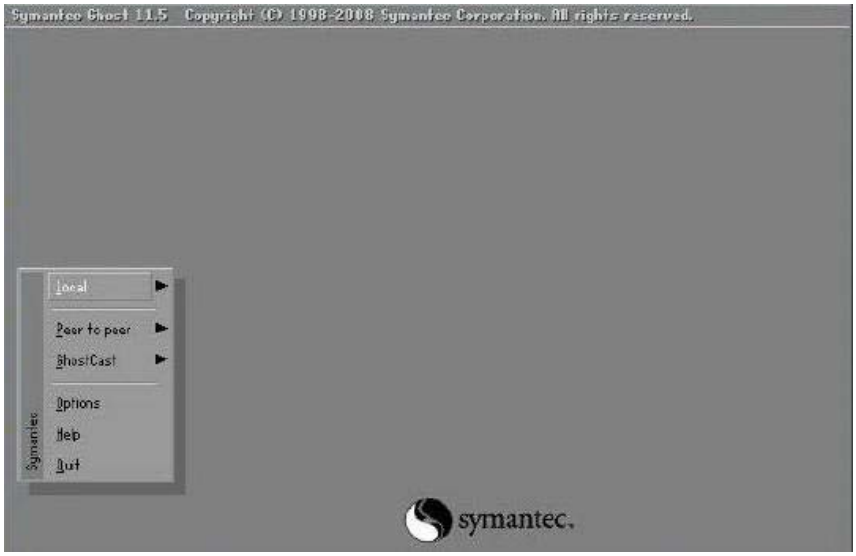
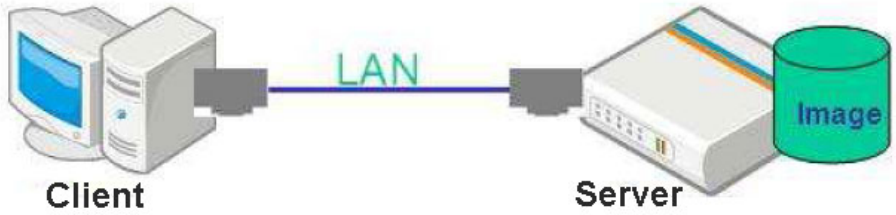


Figure B-41: Symantec Ghost Window

Step 3: When backup or recovery is completed, press any key to reboot the system.

B.6 Restore Systems from a Linux Server through LAN

The One Key Recovery allows a client system to automatically restore to a factory default image saved in a Linux system (the server) through LAN connectivity after encountering a Blue Screen of Death (BSoD) or a hang for around 10 minutes. To be able to use this function, the client system and the Linux system MUST reside in the same domain.



CAUTION:

The supported client OS includes:

- Windows 2000
- Windows XP
- Windows Vista
- Windows 7
- Windows XP Embedded
- Windows Embedded Standard 7

Prior to restoring client systems from a Linux server, a few setup procedures are required.

Step 1: Configure DHCP server settings

Step 2: Configure TFTP settings

Step 3: Configure One Key Recovery server settings

Step 4: Start DHCP, TFTP and HTTP

Step 5: Create a shared directory

Step 6: Setup a client system for auto recovery

The detailed descriptions are described in the following sections. In this document, two types of Linux OS are used as examples to explain the configuration process – CentOS 5.5 (Kernel 2.6.18) and Debian 5.0.7 (Kernel 2.6.26).

B.6.1 Configure DHCP Server Settings

Step 1: Install the DHCP

#yum install dhcp (CentOS, commands marked in red)

#apt-get install dhcp3-server (Debian, commands marked in blue)

Step 2: Confirm the operating system default settings: dhcpd.conf.

CentOS

Use the following command to show the DHCP server sample location:

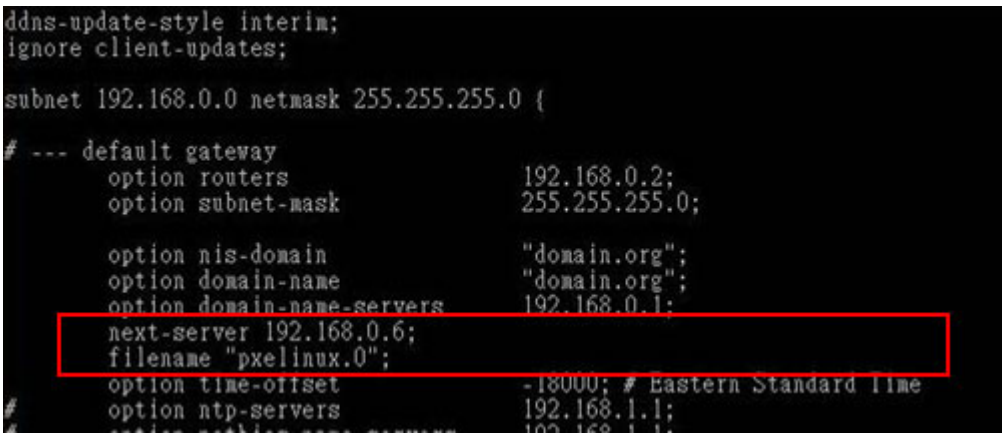
#vi /etc/dhcpd.conf

The DHCP server sample location is shown as below:

Use the following command to copy the DHCP server sample to etc/dhcpd.conf:

#cp /usr/share/doc/dhcp-3.0.5/dhcpd.conf.sample /etc/dhcpd.conf

#vi /etc/dhcpd.conf



Debian

#vi /etc/dhcpd.conf

Edit “/etc/dhcpd.conf” for your environment. For example, add

next-server PXE server IP address;

filename “pxelinux.0”;

```
ddns-update-style interim;
ignore client-updates;

subnet 192.168.0.0 netmask 255.255.255.0 {

# --- default gateway
        option routers                  192.168.0.2;
        option subnet-mask              255.255.255.0;

        option nis-domain               "domain.org";
        option domain-name              "domain.org";
        option domain-name-servers      192.168.0.1;
        next-server 192.168.0.6;
        filename "pxelinux.0";
        option time-offset              -18000; # Eastern Standard Time
#       option ntp-servers              192.168.1.1;
```

B.6.2 Configure TFTP Settings

Step 1: Install the tftp, httpd and syslinux.

#yum install tftp-server httpd syslinux (CentOS)

#apt-get install tftpd-hpa xinetd syslinux (Debian)

Step 2: Enable the TFTP server by editing the “/etc/xinetd.d/tftp” file and make it use the remap file. The “-vvv” is optional but it could definitely help on getting more information while running the remap file. For example:

CentOS

#vi /etc/xinetd.d/tftp

Modify:

disable = no

server_args = -s /tftpboot –m /tftpboot/tftpd.remap -vvv_

```
        socket_type             = dgram
        protocol                = udp
        wait                    = yes
        user                    = root
        server                  = /usr/sbin/in.tftpd
        server_args             = -s /tftpboot -m /tftpboot/tftpd.remap -vvv
        disable                 = no
        per_source              = 11
        cps                     = 100 2
        flags                   = IPv4
```

Debian

Replace the TFTP settings from “inetd” to “xinetd” and annotate the “inetd” by adding “#”.

#vi /etc/inetd.conf

Modify: #tftp dgram udp wait root /usr/sbin..... (as shown below)

```
#:BOOT: TFTP service is provided primarily for booting.  Most sites
#       run this only on machines acting as "boot servers."

#tftp           dgram   udp     wait    root  /usr/sbin/in.tftpd /usr/sbin/in.tftpd -s
 /var/lib/tftpboot
```

#vi /etc/xinetd.d/tftp

```
        socket_type             = dgram
        protocol                = udp
        wait                    = yes
        user                    = root
        server                  = /usr/sbin/in.tftpd
        server_args             = -s /tftpboot -m /tftpboot/tftpd.remap -vvv
        disable                 = no
        per_source              = 11
        cps                     = 100 2
        flags                   = IPv4
```

B.6.3 Configure One Key Recovery Server Settings

Step 1: Copy the **Utility/RECOVERYR10.TAR.BZ2** package from the One Key Recovery CD to the system (server side).

Step 2: Extract the recovery package to /.

#cp RecoveryR10.tar.bz2 /

#cd /

#tar –xvjf RecoveryR10.tar.bz2

Step 3: Copy “pxelinux.0” from “syslinux” and install to “/tftboot”.

#cp /usr/lib/syslinux/pxelinux.0 /tftpboot/

B.6.4 Start the DHCP, TFTP and HTTP

Start the DHCP, TFTP and HTTP. For example:

CentOS

#service xinetd restart

#service httpd restart

#service dhcpd restart

Debian

#/etc/init.d/xinetd reload

#/etc/init.d/xinetd restart

#/etc/init.d/dhcp3-server restart

B.6.5 Create Shared Directory

Step 1: Install the samba.

#yum install samba

Step 2: Create a shared directory for the factory default image.

#mkdir /share

#cd /share

#mkdir /image

#cp iei.gho /image

WARNING:

The file name of the factory default image must be **iei.gho**.

Step 3: Confirm the operating system default settings: smb.conf.

#vi /etc/samba/smb.conf

Modify:

[image]

comment = One Key Recovery

path = /share/image

browseable = yes

writable = yes

public = yes

create mask = 0644

directory mask = 0755

Step 4: Edit "/etc/samba/smb.conf" for your environment. For example:

```
# "security = user" is always a good idea. This will require a Unix account
# in this server for every user accessing the server. See
# /usr/share/doc/samba-doc/htmldocs/Samba3-HOWTO/ServerType.html
# in the samba-doc package for details.
   security = share
```

```
[image]
   comment = One Key Recovery
   path = /share/image
   browseable = yes
   writable = yes
   public = yes
   create mask = 0644
   directory mask = 0755
```

Step 5: Modify the hostname

#vi /etc/hostname

Modify: RecoveryServer

```
RecoveryServer
~
```

B.6.6 Setup a Client System for Auto Recovery

Step 1: **Disable the automatically restart function before creating the factory default image**. Go to: My Computer → Properties → Advanced. Click the Settings button of Startup and Recovery. Deselect "Automatically restart". Click OK to save the settings and exit. (See Figure B-23)

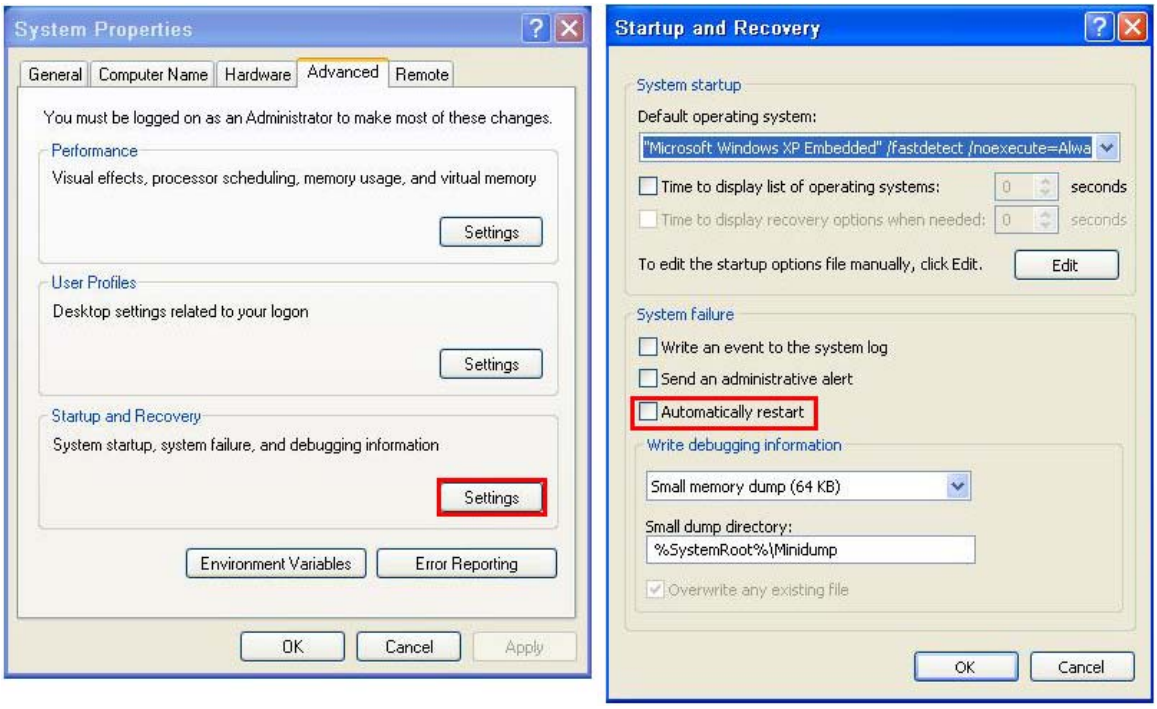


Figure B-42: Disable Automatically Restart

Step 2: Configure the following BIOS options of the client system.

Advanced → iEi Feature → Auto Recovery Function → **Enabled**

Advanced → iEi Feature → Recover from PXE → **Enabled**

Boot → Launch PXE OpROM → **Enabled**

Step 3: Continue to configure the **Boot Option Priorities** BIOS option of the client system:

Boot Option #1 → remain the default setting to boot from the original OS.

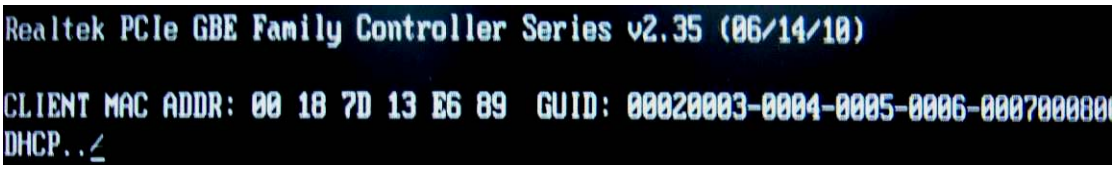
Boot Option #2 → select the boot from LAN option.

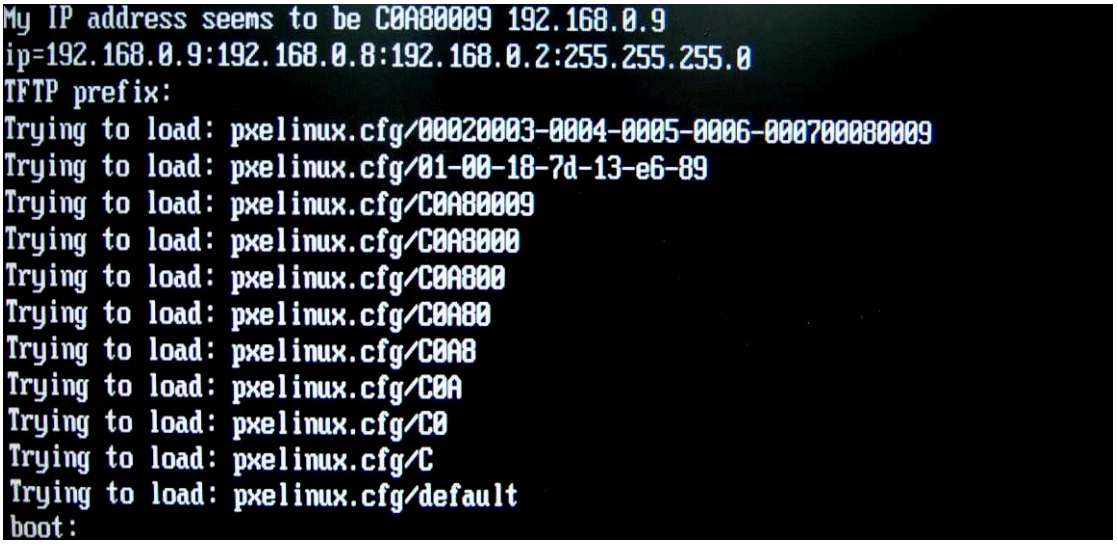
Step 4: Save changes and exit BIOS menu.

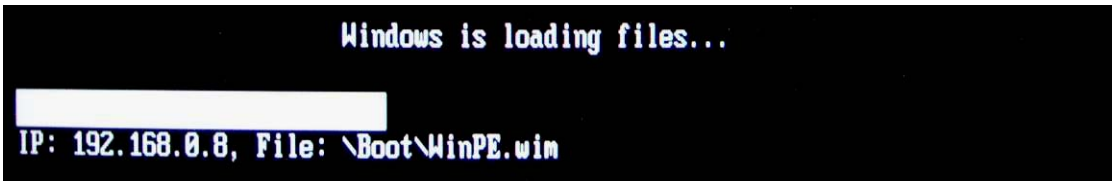
Exit → **Save Changes and Exit**

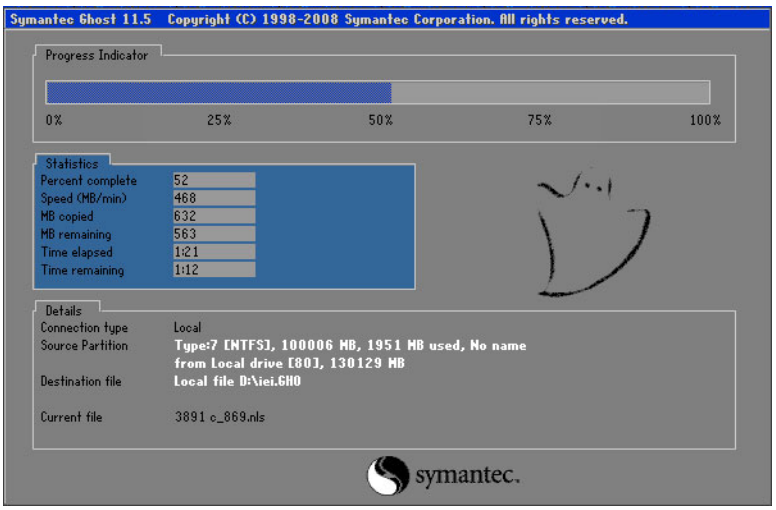
Step 5: Install the auto recovery utility into the system by double clicking the **Utility/AUTORECOVERY-SETUP.exe** in the One Key Recovery CD. This utility MUST be installed in the system, otherwise, the system will automatically restore from the factory default image every ten (10) minutes.

Step 6: Restart the client system from LAN. If the system encounters a Blue Screen of Death (BSoD) or a hang for around 10 minutes, it will automatically restore from the factory default image. The following screens will show when the system starts auto recovering.


Realtek PCIe GBE Family Controller Series v2.35 (06/14/10)
CLIENT MAC ADDR: 00 18 7D 13 E6 89 GUID: 00020003-0004-0005-0006-000700080
DHCP..







NOTE:

A firewall or a SELinux is not in use in the whole setup process described above. If there is a firewall or a SELinux protecting the system, modify the configuration information to accommodate them.

B.7 Other Information

B.7.1 Using AHCI Mode or ALi M5283 / VIA VT6421A Controller

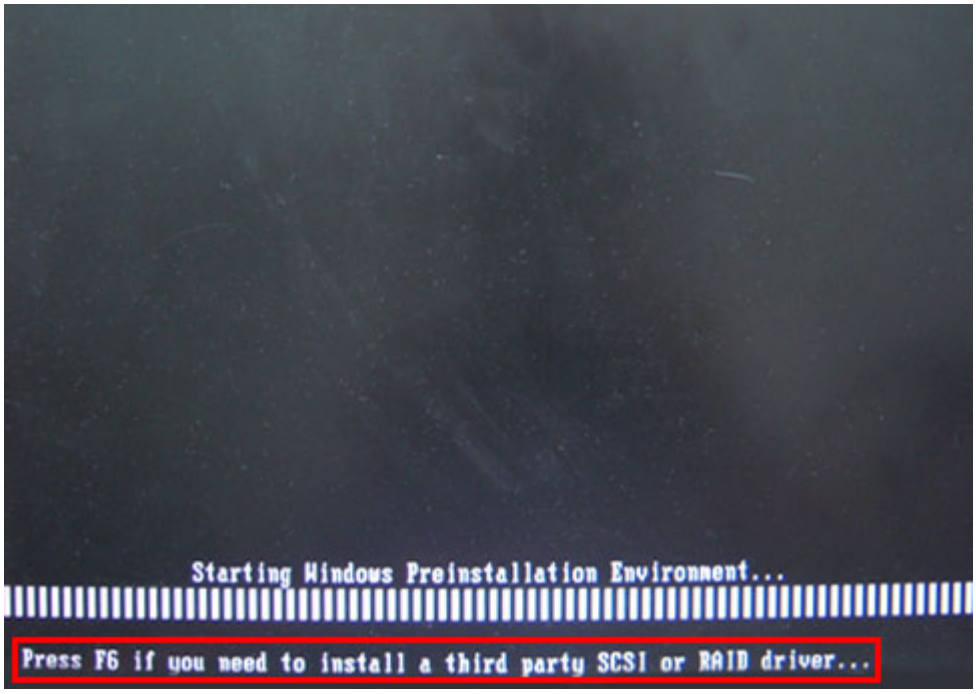
When the system uses AHCI mode or some specific SATA controllers such as ALi M5283 or VIA VT6421A, the SATA RAID/AHCI driver must be installed before using one key recovery. Please follow the steps below to install the SATA RAID/AHCI driver.

Step 1: Copy the SATA RAID/AHCI driver to a floppy disk and insert the floppy disk into a USB floppy disk drive. The SATA RAID/AHCI driver must be especially designed for the on-board SATA controller.

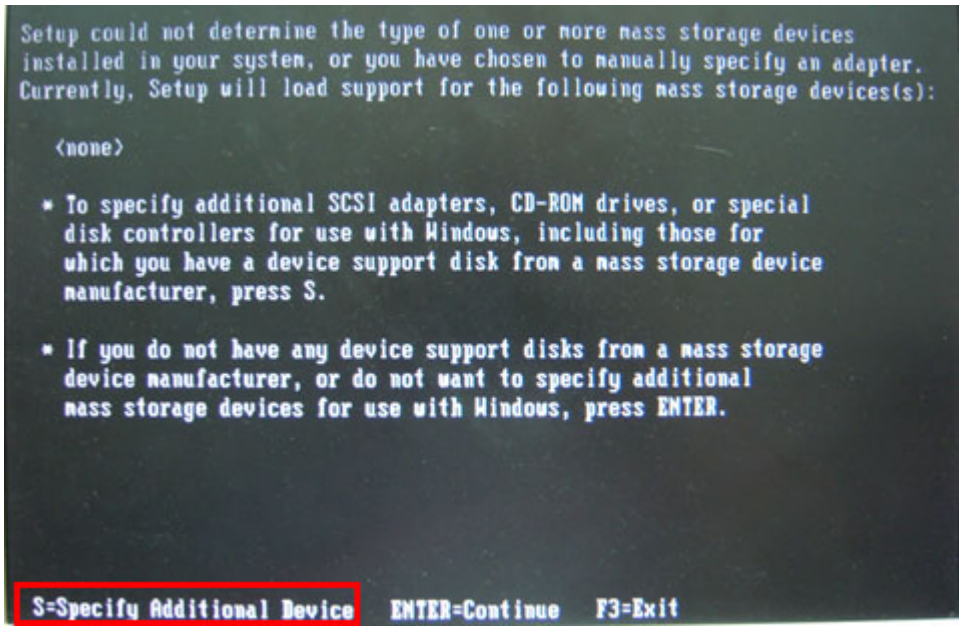
Step 2: Connect the USB floppy disk drive to the system.

Step 3: Insert the One Key Recovery CD into the system and boot the system from the CD.

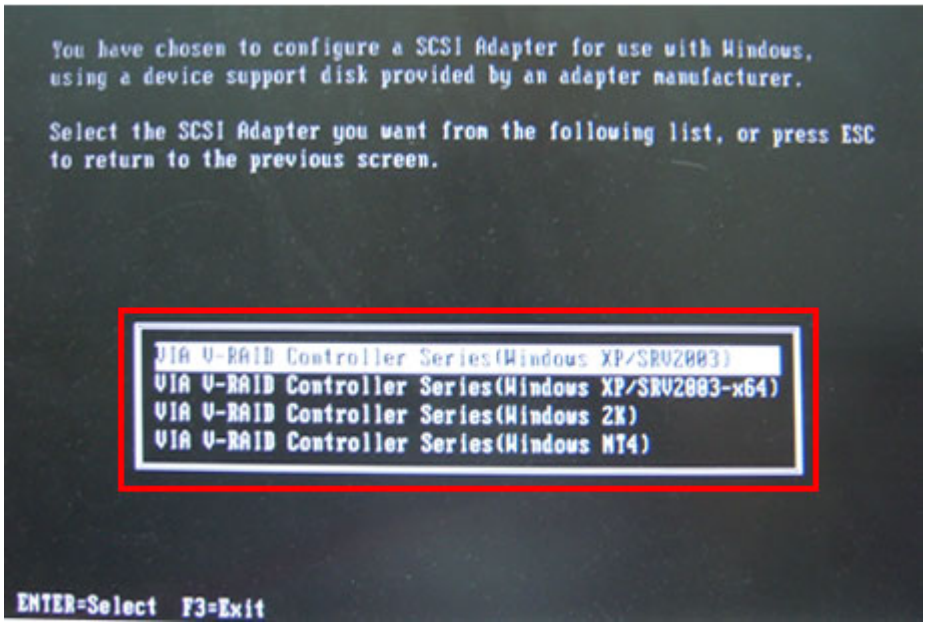
Step 4: When launching the recovery tool, press <**F6**>.



Step 5: When the following window appears, press <**S**> to select “Specify Additional Device”.


Setup could not determine the type of one or more mass storage devices
installed in your system, or you have chosen to manually specify an adapter.
Currently, Setup will load support for the following mass storage devices(s):
<none>
* To specify additional SCSI adapters, CD-ROM drives, or special
disk controllers for use with Windows, including those for
which you have a device support disk from a mass storage device
manufacturer, press S.
* If you do not have any device support disks from a mass storage
device manufacturer, or do not want to specify additional
mass storage devices for use with Windows, press ENTER.
S=Specify Additional Device
ENTER=Continue
F3=Exit

Step 6: In the following window, select a SATA controller mode used in the system. Then press <**Enter**>. The user can now start using the SATA HDD.


You have chosen to configure a SCSI Adapter for use with Windows,
using a device support disk provided by an adapter manufacturer.
Select the SCSI Adapter you want from the following list, or press ESC
to return to the previous screen.
VIA V-RAID Controller Series(Windows XP/SRV2003)
VIA V-RAID Controller Series(Windows XP/SRV2003-x64)
VIA V-RAID Controller Series(Windows 2K)
VIA V-RAID Controller Series(Windows NT4)
ENTER=Select
F3=Exit

Step 7: After pressing <Enter>, the system will get into the recovery tool setup menu. Continue to follow the setup procedure from **Step 4** in **Section B.2.2 Create Partitions** to finish the whole setup process.

B.7.2 System Memory Requirement

To be able to access the recovery tool by pressing <**F3**> while booting up the system, please make sure to have enough system memory. The minimum memory requirement is listed below.

- **Using Award BIOS**: 128 MB system memory
- **Using AMI BIOS**: 512 MB system memory.

Appendix

C

Terminology

AC '97	Audio Codec 97 (AC'97) refers to a codec standard developed by Intel® in 1997.
ACPI	Advanced Configuration and Power Interface (ACPI) is an OS-directed configuration, power management, and thermal management interface.
AHCI	Advanced Host Controller Interface (AHCI) is a SATA Host controller register-level interface.
ATA	The Advanced Technology Attachment (ATA) interface connects storage devices including hard disks and CD-ROM drives to a computer.
ARMD	An ATAPI Removable Media Device (ARMD) is any ATAPI device that supports removable media, besides CD and DVD drives.
ASKIR	Amplitude Shift Keyed Infrared (ASKIR) is a form of modulation that represents a digital signal by varying the amplitude ("volume") of the signal. A low amplitude signal represents a binary 0, while a high amplitude signal represents a binary 1.
BIOS	The Basic Input/Output System (BIOS) is firmware that is first run when the computer is turned on and can be configured by the end user
CODEC	The Compressor-Decompressor (CODEC) encodes and decodes digital audio data on the system.
CMOS	Complimentary metal-oxide-conductor is an integrated circuit used in chips like static RAM and microprocessors.
COM	COM refers to serial ports. Serial ports offer serial communication to expansion devices. The serial port on a personal computer is usually a male DB-9 connector.
DAC	The Digital-to-Analog Converter (DAC) converts digital signals to analog signals.
DDR	Double Data Rate refers to a data bus transferring data on both the rising and falling edges of the clock signal.
DMA	Direct Memory Access (DMA) enables some peripheral devices to bypass the system processor and communicate directly with the system memory.

DIMM	Dual Inline Memory Modules are a type of RAM that offer a 64-bit data bus and have separate electrical contacts on each side of the module.
DIO	The digital inputs and digital outputs are general control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.
EHCI	The Enhanced Host Controller Interface (EHCI) specification is a register-level interface description for USB 2.0 Host Controllers.
EIDE	Enhanced IDE (EIDE) is a newer IDE interface standard that has data transfer rates between 4.0 MBps and 16.6 MBps.
EIST	Enhanced Intel® SpeedStep Technology (EIST) allows users to modify the power consumption levels and processor performance through application software. The application software changes the bus-to-core frequency ratio and the processor core voltage.
FSB	The Front Side Bus (FSB) is the bi-directional communication channel between the processor and the Northbridge chipset.
GbE	Gigabit Ethernet (GbE) is an Ethernet version that transfers data at 1.0 Gbps and complies with the IEEE 802.3-2005 standard.
GPIO	General purpose input
HDD	Hard disk drive (HDD) is a type of magnetic, non-volatile computer storage device that stores digitally encoded data.
ICH	The Input/Output Control Hub (ICH) is an Intel® Southbridge chipset.
IrDA	Infrared Data Association (IrDA) specify infrared data transmission protocols used to enable electronic devices to wirelessly communicate with each other.
L1 Cache	The Level 1 Cache (L1 Cache) is a small memory cache built into the system processor.
L2 Cache	The Level 2 Cache (L2 Cache) is an external processor memory cache.
LCD	Liquid crystal display (LCD) is a flat, low-power display device that consists of two polarizing plates with a liquid crystal panel in between.

LVDS	Low-voltage differential signaling (LVDS) is a dual-wire, high-speed differential electrical signaling system commonly used to connect LCD displays to a computer.
POST	The Power-on Self Test (POST) is the pre-boot actions the system performs when the system is turned-on.
RAM	Random Access Memory (RAM) is volatile memory that loses data when power is lost. RAM has very fast data transfer rates compared to other storage like hard drives.
SATA	Serial ATA (SATA) is a serial communications bus designed for data transfers between storage devices and the computer chipsets. The SATA bus has transfer speeds up to 1.5 Gbps and the SATA II bus has data transfer speeds of up to 3.0 Gbps.
S.M.A.R.T	Self Monitoring Analysis and Reporting Technology (S.M.A.R.T) refers to automatic status checking technology implemented on hard disk drives.
UART	Universal Asynchronous Receiver-transmitter (UART) is responsible for asynchronous communications on the system and manages the system's serial communication (COM) ports.
UHCI	The Universal Host Controller Interface (UHCI) specification is a register-level interface description for USB 1.1 Host Controllers.
USB	The Universal Serial Bus (USB) is an external bus standard for interfacing devices. USB 1.1 supports 12Mbps data transfer rates and USB 2.0 supports 480Mbps data transfer rates.
VGA	The Video Graphics Array (VGA) is a graphics display system developed by IBM.

Appendix

D

Digital I/O Interface

D.1 Introduction

The DIO connector on the IMBA-Q870-i2 is interfaced to GPIO ports on the Super I/O chipset. The DIO has both 4-bit digital inputs and 4-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.

NOTE:

For further information, please refer to the datasheet for the Super I/O chipset.

D.2 DIO Connector Pinouts

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	VCC
3	Output 3	4	Output 2
5	Output 1	6	Output 0
7	Input 3	8	Input 2
9	Input 1	10	Input 0

Table 6-1: Digital I/O Connector Pinouts

D.3 Assembly Language Samples

D.3.1 Enable the DIO Input Function

The BIOS interrupt call INT 15H controls the digital I/O. An assembly program to enable digital I/O input functions is listed below.

MOV	**AX, 6F08H**	Sets the digital port as input
INT	**15H**	Initiates the INT 15H BIOS call

D.3.2 Enable the DIO Output Function

The BIOS interrupt call INT 15H controls the digital I/O. An assembly program to enable digital I/O output functions is listed below.

MOV	**AX, 6F09H**	Sets the digital port as output
MOV	**BL, 09H**	
INT	**15H**	Initiates the INT 15H BIOS call

Appendix

E

Watchdog Timer

NOTE:

The following discussion applies to DOS environment. Contact IEI support or visit the IEI website for specific drivers for other operating systems.

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMIs or a software bug. When the CPU stops working correctly, Watchdog Timer either performs a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer.

INT 15H:

AH – 6FH Sub-function:	
AL – 2:	Sets the Watchdog Timer's period.
BL:	Time-out value (Its unit-second is dependent on the item "Watchdog Timer unit select" in CMOS setup).

Table E-1: AH-6FH Sub-function

Call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer starts counting down. When the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the watchdog timer is disabled if the time-out value is set to zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

NOTE:

When exiting a program it is necessary to disable the Watchdog Timer, otherwise the system resets.

EXAMPLE PROGRAM:

```
; INITIAL TIMER PERIOD COUNTER

;
W_LOOP:
;

        MOV     AX, 6F02H       ;setting the time-out value
        MOV     BL, 30          ;time-out value is 48 seconds
        INT     15H

;
; ADD THE APPLICATION PROGRAM HERE
;

        CMP     EXIT_AP, 1      ;is the application over?
        JNE     W_LOOP          ;No, restart the application

        MOV     AX, 6F02H       ;disable Watchdog Timer
        MOV     BL, 0           ;
        INT     15H

;
; EXIT ;
```

Appendix

F

Hazardous Materials Disclosure

F.1 Hazardous Materials Disclosure Table for IPB Products Certified as RoHS Compliant Under 2002/95/EC Without Mercury

The details provided in this appendix are to ensure that the product is compliant with the Peoples Republic of China (China) RoHS standards. The table below acknowledges the presences of small quantities of certain materials in the product, and is applicable to China RoHS only.

A label will be placed on each product to indicate the estimated “Environmentally Friendly Use Period” (EFUP). This is an estimate of the number of years that these substances would “not leak out or undergo abrupt change.” This product may contain replaceable sub-assemblies/components which have a shorter EFUP such as batteries and lamps. These components will be separately marked.

Please refer to the table on the next page.

Part Name	Toxic or Hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	X	O	O	O	O	X
Display	X	O	O	O	O	X
Printed Circuit Board	X	O	O	O	O	X
Metal Fasteners	X	O	O	O	O	O
Cable Assembly	X	O	O	O	O	X
Fan Assembly	X	O	O	O	O	X
Power Supply Assemblies	X	O	O	O	O	X
Battery	O	O	O	O	O	O

O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in SJ/T11363-2006

X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in SJ/T11363-2006

此附件旨在确保本产品符合中国 RoHS 标准。以下表格标示此产品中某有毒物质的含量符合中国 RoHS 标准规定的限量要求。

本产品上会附有"环境友好使用期限"的标签，此期限是估算这些物质"不会有泄漏或突变"的年限。本产品可能包含有较短的环境友好使用期限的可替换元件，像是电池或灯管，这些元件将会单独标示出来。

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
壳体	X	O	O	O	O	X
显示	X	O	O	O	O	X
印刷电路板	X	O	O	O	O	X
金属螺帽	X	O	O	O	O	O
电缆组装	X	O	O	O	O	X
风扇组装	X	O	O	O	O	X
电力供应组装	X	O	O	O	O	X
电池	O	O	O	O	O	O
O: 表示该有毒有害物质在该部件所有物质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。 X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。						